AERIAL AGE WEEKLY

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An unusual view of the battlefleet riding in the Hudson River as seen from the air. © International Film Service.

Opening of Atlantic City Convention to be Victory Loan Rally

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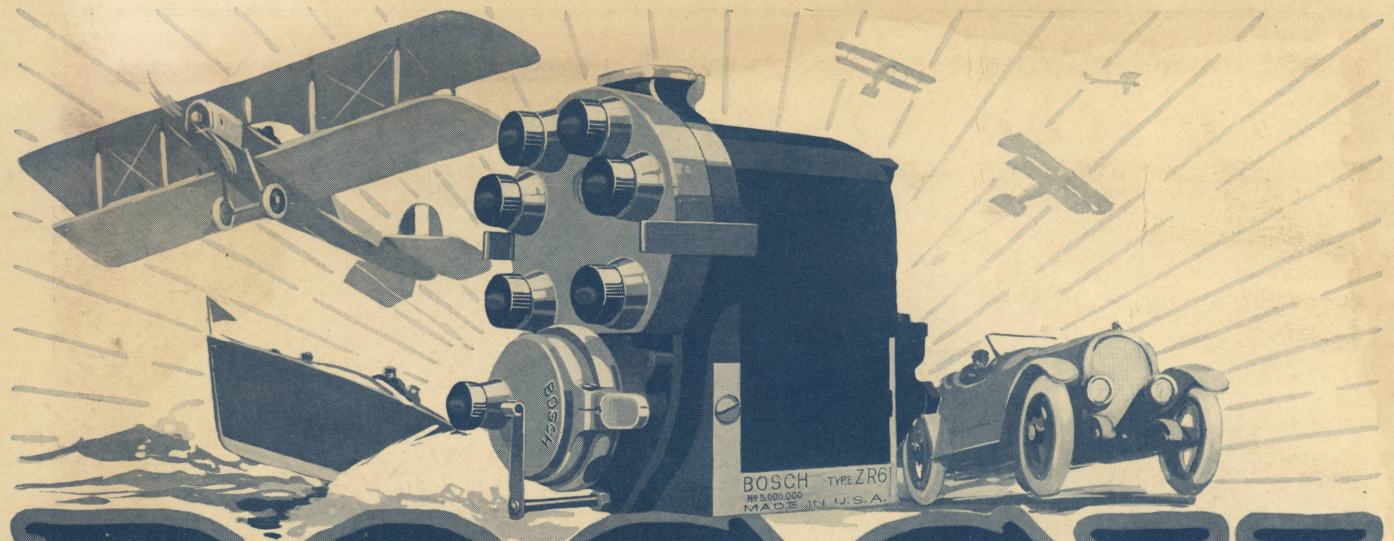

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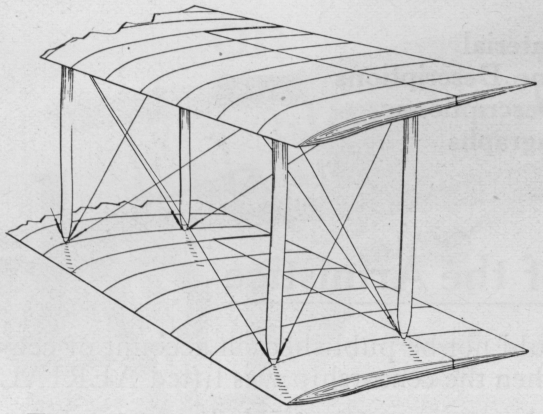
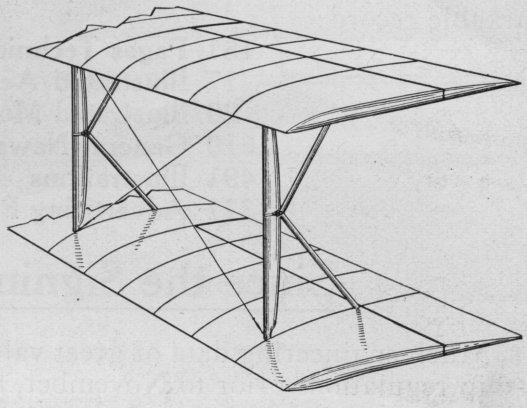
COMPARISON OF RESISTANCE AND WEIGHT OF K-BAR AND DOUBLE LIFT TRUSS SYSTEMS



The following is an exact Comparison of Resistance and Weight:



The K-bar Truss reduces interference by eliminating interplane struts and wires and also by affording increased Gap cord ratio.

At a speed of 100 M.P.H.,
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Safety factor of 8,
Aspect ratio of 6,
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Gap/chord ratio of Double Lift Truss...1.000

Resistance of K-Bar Truss is $\frac{97.2}{185.0}$ = 52.5% of resistance of Double Lift Truss.

Weight of K-Bar Truss is $\frac{106.45}{146.57}$ = 72.7% weight of Double Lift Truss.

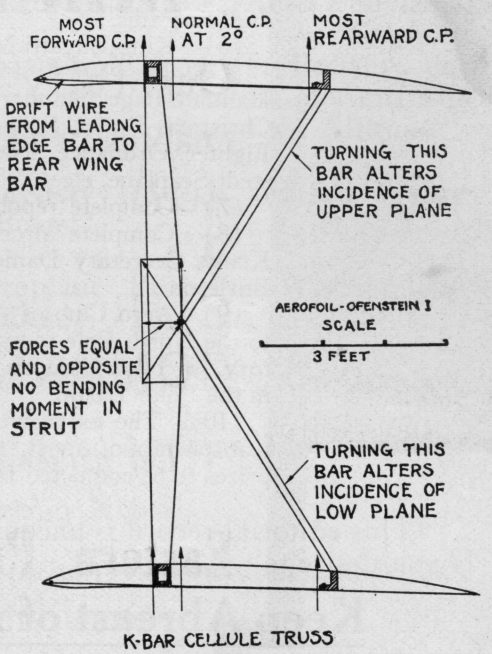
Normal C. P. near central wing bar, only light forces at most rearward C. P.

RESISTANCE AND WEIGHT OF K-BAR TRUSS SYSTEM

Member	Size"	Length"	Area Sq. Ft.	Kx	No.	Rx#	Wt.#
Inner Panel Lift Wire	½	141	.49	.0026	2	25.4	19.1
Inner Panel Landing Wire	1/8	141	.306	.0026	2	15.9	9.55
Outer Panel Lift Wire	1/8	154	.334	.0026	2	17.3	10.4
Outer Panel Landing Wire	3/8	154	.2	.0026	2	10.4	3.9
Inner Strut	2.64	96	1.76	.0004	2	14.1	31.0
Outer Strut	1.98	96	1.32	.0004	2	10.5	17.5
Inner Upper K-Bar	⅞	56	.34	.0004	2	2.7	1.7
Inner Lower K-Bar	1½	56	.583	.0004	2	4.7	5.2
Outer Upper K-Bar	⅝	56	.243	.0004	2	1.9	1.7
Outer Lower K-Bar	1⅜	56	.535	.0004	2	4.3	6.4
						97.2	106.45

RESISTANCE AND WEIGHT OF DOUBLE LIFT TRUSS SYSTEM

Member	Size"	Length"	Area Sq. Ft.	Kx	No.	Rx#	Wt.#
Rear Inner Panel Lift Wire	½	131	.455	.0026	2	23.6	17.7
Rear Inner Panel Landing Wire	1/8	131	.284		2	14.8	8.8
Rear Outer Panel Lift Wire	1/8	147	.318		2	16.5	9.9
Rear Outer Panel Landing Wire	3/8	147	.191		2	9.9	3.72
Front Inner Panel Lift Wire	1/8	131	.398		2	20.7	13.7
Front Inner Panel Landing Wire	¼	131	.228		2	11.8	6.5
Front Outer Panel Lift Wire	¼	147	.256		2	13.3	7.3
Front Outer Panel Landing Wire	⅛	147	.128		2	6.6	2.4
Inner Panel Inner Wire	¼	95	.166		4	17.3	9.1
Outer Panel Inner Wire	3/8	95	.124		4	12.9	1.8
Rear Inner Strut	2.42	84	1.41	.0004	2	11.3	22.8
Rear Outer Strut	1.74	84	1.01	.0004	2	8.1	11.8
Front Inner Strut	2.29	84	1.33	.0004	2	10.6	20.5
Front Outer Strut	1.64	84	.96	.0004	2	7.6	10.5
						185.0	146.57



K-BAR CELLULE TRUSS

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Dayton, Ohio
Business address: 918 Reibold Bldg., Dayton, Ohio

AERIAL AGE WEEKLY

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VOL. IX NEW YORK, APRIL 28, 1919 NO. 7

OPENING OF ATLANTIC CITY CONVENTION TO BE GREAT VICTORY LOAN RALLY

New York Herald Adds $3000 to Long List of Trophies and Prizes for Competition and Atlanta Journal Adds $1750

THE opening of the Second Pan-American Aeronautic Convention and Exposition is to be a Great Liberty Loan Rally.

Two more important prizes have been added to the long list. The New York *Herald* has offered a series of prizes amounting to $3000 for the best records made with aeroplanes of different horse power, from 100 h.p. to 1500 h.p. The Atlanta *Journal* has added prizes totalling $1750 to be awarded to the three aviators who make the best records in flying from Atlanta to New York carrying copies of the Atlanta *Journal*.

$1,000 Additional Cash Prizes for Intercollegiate Races

$1000 additional cash prizes have been offered for the Intercollegiate races, the prizes to go to defray the expenses of the Collegiate clubs competing.

The second Pan-American Aeronautical Convention, to be held at Atlantic City throughout the month of May, gives every promise of developing into the ace of aviation meets in the world's history. Featured by many notable contests that will try the war-won skill of scores of young men who winged the Hun under all sorts of battle conditions, the big objective of the meet will be to demonstrate the peace possibilities of the aircraft under war's pressure.

Great interest will be attached to the five Saturdays included in the month's programme when the spectacular stunts of competition, in which many aces of the Allied nations are entered, will be staged, while every day activities of the convention will be interesting because of the tests of all types of winged ships and the lectures by aviators and other aviation experts at the convention headquarters on the Steel Pier.

Aviation Field Ready

Preparations for the meet are now nearing completion. The big Municipal Aviation Field on the west side of the resort has been graded down and full facilities installed for aircraft about the field, which measures almost a mile square. Clubhouse features are ready just across the Meadow Boulevard opposite the field for the fliers, while just beyond along one of the protected reaches of the inside waters parking spaces for seaplanes have been arranged so that the birdmen who arrive here next week to tune up their ships and acquaint themselves with the atmospheric conditions of this section of the coast will have everything they need for their trial spins.

Included among the Saturday features will be seaplane contests over measured courses for both straightaway and altitude work, and the special intercollegiate race, in which Harvard, Yale, Columbia, Pennsylvania and several other of the leading universities will be represented. Land aeroplane contests, dirigible races, kite balloon speed events in ascending, descending and manœuvring, parachute competition and a novelty event for the "aviettes"—bicycles and motorcycles equipped with wings—are on the programme for the week ends, while on the daily list are exhibits of aeroplanes, motors, accessories, demonstrations and tests of sea and land planes, motors, dirigibles, balloons, passenger and lifting tests, showing the commercial possibilities of the lighter and heavier-than-air machines.

Interest in Pulitzer Trophy

It is expected that not less than a million people will witness the contest for the Pulitzer Trophy, offered by *The World* and the St. Louis *Post-Dispatch*. The keen interest which has been displayed in this long-distance event, and the number of expressions of intentions to enter, give assurance of spirited rivalry, making it almost certain that the month will see all American records broken.

Sixteen prize contests have already been arranged by the management of the convention. The promise is given that there will be a large number of others, many of first-class importance.

The Pulitzer Trophy, valued at $5,000, will go to the aviator making the longest flight to or from Atlantic City. Following th offer by *The World* and the *Post-Dispatch*, the *Boston Globe*, Cleveland *Plain Dealer* and Detroit *News* also offered trophies, with first, second and third cash prizes of $1,000, $500 and $250 respectively for the best flights between the city in which those newspapers are published and Atlantic City. The Atlanta *Journal* also has offered cash prizes of $1,000, $500 and $250 for the best flights in one day from Atlanta to Atlantic City, the contestants to carry and deliver copies of the *Journal* of current date.

Money awards so far total over $50,000, and it is expected that this amount will be doubled before the meet officially opens. Every effort is being made to have some flyer start or finish a transatlantic flight on Atlantic City's beach, the Aero Club of Atlantic City offering $25,000 to the successful aviator.

ARMY AVIATOR MAKES FIRST CHICAGO-NEW YORK NON-STOP FLIGHT

THE first non-stop aeroplane flight from Chicago to New York was made April 19 by Captain E. F. White, an American Army aviator, who flew 727 miles in a De Haviland Four army reconnaissance plane at an average speed of about 106 miles an hour. He ascended from the Ashburn Aviation Field, Chicago, at 9:50 o'clock, central time, and descended at Hazelhurst Field at Mineola, L. I., at 5:40 o'clock in the afternoon, the actual flying time being 6 hours and 50 minutes.

Officials of the Aero Club of America said they believed

that Captain White would have not only the honor of making the first non-stop flight between Chicago and New York City, but that he might also have the honor, for a while at least, of holding the American, and perhaps the world's record, for continuous flight.

In beginning the flight that Victor Carlstrom, Ruth Law, Katherine Stinson and many other aviators have attempted with only a short margin of distance cutting them from success, Captain White had great difficulty in taking to the air on the soft ground of Ashburn Field, the take-off grounds approved by the Aero Club of Illinois. The ground there was soft and the heavy army plane, with her load of more than 190 gallons of gasoline, cut into it deeply, but after the aviator had had his plane dragged to a drier and harder spot in the field he managed to take to the air.

Circling over Chicago, Captain White ascended to a height of more than 10,000 feet and throughout his flight he did not go below this level until he was ready to land, and at intervals he flew as high as 12,000 feet. He followed the route of the New York Central Railroad for the greater part of the distance, and cities along the route reported seeing him flying at great height and at high speed.

Colonel Archibald Miller, Director of Aviation in the Department of the East and one of the commanders of the Hazelhurst Field, was waiting there to meet Captain White and his mechanician, H. M. Schaffer, and they were taken to the field headquarters, where an informal reception was held.

The biplane used by Captain White in his flight was one of the standard De Haviland Four machines constructed for the use of the army in France, equipped with a twelve-cylinder Liberty motor of about 400 horsepower.

The machine was prepared for the trip at McCook Field, near Dayton, Ohio, and tested thoroughly in several flights. As one of the last tests, Captain White flew the machine from Dayton to Detroit. On Friday he flew it from Detroit to Chicago, and the motors and plane behaved so well on that test flight that Captain White decided to try to fly to New York without delay.

In making his landing at Ashburn Field upon his arrival there from Detroit the aviator had difficulty in landing because of the muddy condition of the field.

Get News of the Start

Shortly after 10 o'clock in the morning Henry Woodhouse of the Board of Governors of the Aero Club of America, received a telegram from James S. Stephens, President of the Aero Club of Illinois, saying that the Board of Governors of that organization had received notice from Captain White that the record flight would be attempted. The telegram added that the start had been made at 9:40 o'clock, central time, and asked that a representative of the Aero Club of America, with the army officers of the Eastern Department and of the army aviation fields at Mineola, set the actual time of the arrival of the plane in this city.

Hours before the plane was due to arrive at Mineola a group of officers had gathered at the landing place to wait the ending of the flight. Telegrams were received from towns in Indiana, from Cleveland, Ohio, and other places in this State advising them that Captain White was still in the air. Officials of the Aero Club were on the watch in this city and they caught sight of the dark blue machine about 5:30 o'clock as she circled high overhead on her way to the landing place.

Captain White would not discuss the details of the flight when he landed, and the army officers did not press him to talk because of the manifestation of weariness both by him and his mechanic. He said that the winds and all other atmospheric conditions had been perfect throughout the flight and that this, with the perfect functioning of the motor and the good behavior of the plane, enabled him to make the continuous flight. He said that he felt no more tired than he would have felt had he ridden three hours in an automobile, but it was plain to the officers that the long nervous strain had had its effect upon him and his mechanic.

Give Aviation Its Chance

THE news that the military aviation program of the War Department is to be sharply curtailed at once should not greatly startle any one who is in touch with the general scheme of our demobilization plan. An army of a little more than 500,000 men, such as is proposed for the United States obviously does not need the aviation equipment of an army of 4,000,000. Whether the demotion of Major-General William L. Kenly, director of military aeronautics, to a position as colonel of artillery is or is not inspired by official hostility to his plan for a permanent aviation organization distinct from the army, navy and marine corps is beside the question. We were certain to hear before long of a reduction in the size of the service.

Much more seriously to be regretted is the apparent governmental inclination to turn its back on all aviation, military or commercial, and leave the infant industry to struggle along as best it may under the guidance and in the hands of private citizens. After the fabulous sums that have been spent in furtherance of our air program the country will certainly resent the scrapping of our vast resources of aeroplanes and equipment, which are apparently to be thrown on the market in casual manner as salvage. Aviation undoubtedly has a wonderful future both commercially and as a sport, but it will need careful fostering for months and years to come, and this fostering only the government is in a position to supply. Great Britain and several continental countries have already learned this lesson and are putting state resources behind the development of commercial aviation; but so far only the Post Office Department seems to be showing an equal interest over here.—Editorial in New York *Globe*.

Congress Should Establish an Aeronautical Policy

ALTHOUGH the aeroplane is an American invention, the United States was hopelessly outclassed at the beginning of the European struggle in the development and application of what has proved a sensationally successful weapon of war and is sure to play an increasingly important part in peace.

When we entered the conflict in 1917 we had no aeroplanes worth talking about, no aeroplane factories of consequence, no aeroplane motors. We had to begin at the bottom of the industry and learn its processes step by step. We had generous helpers in the nations that had been fighting Germany. They laid their experience before us and gave us the advantage of their researches, their errors and their triumphs.

The United States made many blunders, costly mistakes and futile experiments in its aeroplane endeavor. But after a time we began to produce aeroplanes as good as any other nation could turn out, with pilots and observers second to those of no other country. To do this cost us hundreds of millions of dollars, which nobody begrudges, and scores of promising lives, which all regret.

As the armistice was signed the United States was prepared to take and told its proper place as the leading nation in aeroplane production and in the military use of aeroplanes. A sane and intelligent public policy would keep it in that leadership, war or no war.

Has the Administration adopted such a policy? Has it sought to encourage experiment, to encourage improvement, to encourage national enterprise in airships?

It has not.

Instead, as the facts and figures disclosed by Senator New of Indiana in *The Sun* yesterday show, the Administration has set out to wreck the costly structure of production built up during the war, to scrap the material on hand, to disband the organization of experts laboriously gathered together, and to discourage continued efforts in the field of incalculable importance to America as a nation and to Americans as individuals. The Administration is abandoning all that has been gained, and unless its purpose can be frustrated it will reduce us to the humiliating situation we were in before the war.

This folly can be avoided. The United States can be kept where it belongs in aeronautics. America's achievements in the air can be utilized as the foundation for greater successes in the future. And these things can be done immediately by the calling of Congress in special session, so that the representatives of the American people can adopt and put in force a military and naval aeronautical policy which shall protect the nation and promote its interests in a great industry of the future.—Editorial in New York *Sun*.

THE NEWS OF THE WEEK

Major Macauley Flies 2,400 Miles in 17 Hours

Americaus, Ga., April 17.—Major T. C. Macauley arrived at Souther Field on April 16 from San Diego, Cal., making the flight of 2,400 miles in nineteen hours, with one stop at Fort Worth, Tex. His speed averaged 137 miles an hour.

He had been closely following a storm moving to the east, and overtook it on the Florida-Georgia line, turned about and came back to Souther Field.

He made four stops, at Tucson, Sweetwater, Fort Worth and Americus.

Newark Firm Announces Aerial Merchandise Delivery Service to Asbury Park

The L. S. Plaut & Co. department store of Newark announced on April 19 that, beginning next Monday, it would make aeroplane deliveries of merchandise to customers at Asbury Park. It was announced that a Newark-built Wittemann-Lewis Aircraft Corporation aeroplane would be used, and that the pilot would, at the beginning of the flight, circle Military Park in Newark, dropping Victory Loan leaflets and an envelope containing a $50 Victory bond.

Brazil Appropriates $500,000 for Civil and Military Aeronautics

Brazil will spend half a million dollars this year for advancing aviation, a Rio de Janeiro dispatch announced recently.

The ministry of war will use the sum in organizing an aviation service, buying aeroplanes, establishing aviation schools and purchasing necessary supplies, it was stated.

The service will be operated for civil needs, but will be ready for war purposes.

Aeroplane Used to Locate Home Site

Palm Beach, Fla.—William Van Alen, of Severance & Van Alen, architects, rerently was called upon by a client to select the most advantageous position for the location of a new villa. The property extends from the ocean to Lake Worth and comprises about twenty acres. At the present time it is practically impenetrable on account of the jungle which runs through it, connecting up some low land containing water, which requires filling in. The central road bisecting the property did not afford a sufficient point of vantage to determine the contour of the property. The advantage of using an aeroplane for the obtaining of this information appealed to Mr. Van Alen at once. He therefore hired a pilot from an aerodrome to take him up and they flew together over the property until Mr. Van Alen had obtained the information he sought.

B. C. Boulton, formerly of the Research Department, Department of Military Aeronautics, Authority on Stress Analysis of Aeroplanes and design of structural parts, is now Special Contributing Editor to Aerial Age

B. C. Boulton Joins Aerial Age Contributing Staff

AERIAL AGE is gratified to be able to announce to its readers this week that it has secured the services of B. C. Boulton, of the Engineering Staff at McCook Field as a Special Contributing Technical Editor.

Mr. Boulton's work has been in the Research Department, renamed this year the Structures and Aerodynamics Section of the Aeroplane Department, Engineering Division. His work has been on the stress analysis of aeroplanes, both those designed at the Field and the very numerous ones submitted for sand test, including the analysis of the wing cell, chassis, fuselage and miscellaneous parts. He designed and proportioned the structural members of the aeroplanes built at the field, and criticized and made recommendations for others that were submitted by manufacturers to the Government. One of the most important phases of his work was the development of the present Government methods of analysis.

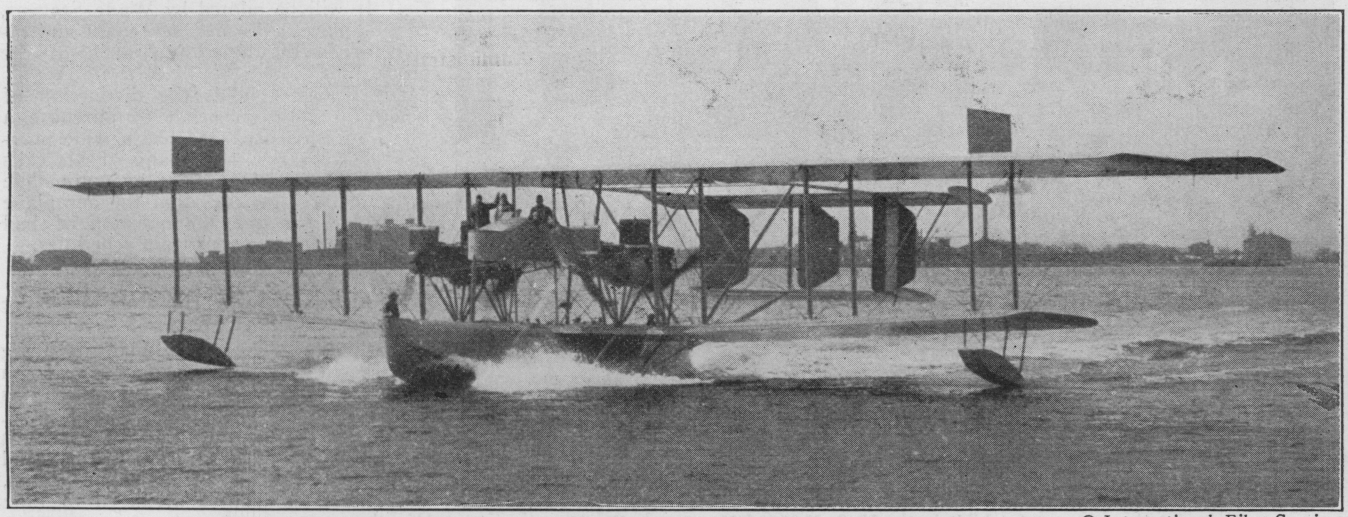
Mr. Boulton has done a good deal in devising and developing new forms of construction and in adopting new materials to aeroplane work. He has, also, been very closely in touch with the Testing Department, and has frequently been called upon to write the more important and difficult reports issued by the Testing Department.

Mr. Boulton graduated in 1916 from the Massachusetts Institute of Technology in Civil Engineering, and until going to McCook Field in November, 1917, he practiced that profession, specializing in structural work.

From the wide experience which Mr. Boulton has had, the material which he will prepare for AERIAL AGE will be authoritative and thoroughly up-to-date in character.

The Trans-Atlantic Flight

Three contenders in the competition for the *Daily Mail* prize have been ready for the past week to undertake the trans-Atlantic flight, but have been prevented from starting by severe weather prevailing in the North Atlantic. One of these, Major J. C. P. Wood, who will fly westward from Limerick, Ireland, came to grief on April 18 in the first step of his flight by falling into the Irish Sea en route from Eastchurch to Ireland. The forced descent resulted from a surplus flow of fuel causing carburetor trouble. Repairs, however, will be completed as rapidly as possible.



© International Film Service.

The NC-2, powered by four Liberty motors is undergoing exhaustive tests at Rockaway Naval Air Station, in preparation for the attempt to fly across the Atlantic

On April 16 Captain C. W. F. Morgan made the first trial flight at St. John's, N. F., of the Martinsyde aeroplane, the Rymore. The test showed that the motor and radio were in good working order. Owing to the very unfavorable weather existing since that date, no further tests were made prior to April 21.

Harry G. Hawker and Lieutenant Commander Grieve are also impatiently awaiting the advent of favorable weather. Every test has been made of their Short aeroplane and its equipment, and nothing remains to be done in preparation for the flight.

The tests of the NC planes being groomed for the big flight continue. The NC-4 has been delivered by the Curtiss Company and is being assembled at Rockaway. The NC-3 will be ready for trials within a few days. It is not known how soon the NC-1 will be ready for further trials.

A trial flight of the NC-2 was made under full load on April 17, but she failed to rise from the water. No explanation was made of the failure of the trial, but a redistribution of weights is expected to remedy the trouble.

Lieutenant Commander P. N. L. Bellinger has reported to Commander Towers regarding the selection of a "jumping-off" place for the Navy fliers. It is said a site has been selected on the shores of the Bay of Biscay, on the south coast of Newfoundland.

The ninth entry for the *Daily Mail* Prize has been made by J. A. Peters, representing the Alliance Aeroplane Company. Mr. Peters is to act as pilot, and will be accompanied by Captain N. R. Curtiss as navigator and assistant pilot. The plane is a 450 horse power biplane.

Lieut. Fontan made another start on April 19 for Casablanca, on the west coast of Morocco, from where he will attempt to fly to South America, but no information has been received confirming his safe arrival at that point.

It is reported that the Handley Page biplane, which has been entered by the manufacturers, has been prepared for transport, and will be ready for the flight by the middle of May.

Mr. Sydney Pickles (retired Flight-Lieutenant, R.N.A.S.) has handed in his entry for the Atlantic flight at the Aero Club.

He will, says the Central News, make an attempt to fly from St. John's, Newfoundland, early this month in a Fairey patent variable wing aeroplane, and he hopes to accomplish the journey to Southampton in fourteen hours. Mr. Pickles is a young Australian, who took part in many bombing raids on Ostend and Zeebrugge.

First American-Built Battle Plane De H. 4, Shown By U. S. National Museum

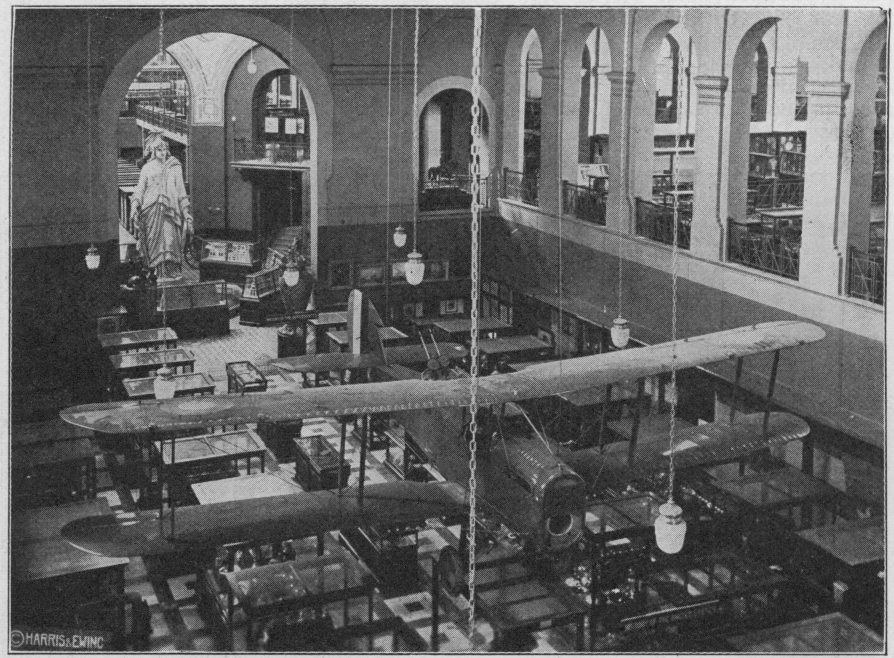
Washington, D. C.—The U. S. National Museum now has on exhibition the first American-built battle plane constructed in this country for the U. S. Government. This plane was constructed in Dayton, Ohio, by the Dayton-Wright Aeroplane Company, and was completed on October 29, 1917. It is the first plane flown with a Liberty 12 motor. The De H. 4 was adopted by the United States Government in 1917 for use by the American Expeditionary Forces as a day-bomber and observation plane. It was first flown on the day of its completion at the South Field of the Dayton-Wright Company in Ohio. Since that time it has been used for all military tests and experiments intended to improve the De H. 4. In all, more than 2,600 experiments, ranging from motor tests and different propellers to slight changes in control surfaces, have been made on this machine.

The machine carries full military equipment, including ten No. 25 bombs, camera, wireless telegraph and generator, oxygen bottles and helmets, intercommunicating telephone, heated clothing and generator, and armament consisting of two Lewis and two Marlin machine guns.

About eighteen hundred of these aeroplanes were delivered to the Army in France and they were used extensively on the front for day bombing and observation work.

Bleriot-Spad at Indianapolis Speedway During International Race

Andre Boillot will fly the latest type of French battleplane at the Indianapolis race meeting on May 31. Boillot was given a Croix de Guerre for his service at the front. For the last twelve months he has been chief test and experimental pilot for the Bleriot Company.



The first American-built battleplane—a De Haviland made by the Dayton-Wright Company—on display at the permanent exhibit in the U. S. National Museum at Washington

Civilian Flying Licenses Issued By Joint Army and Navy Board of Aeronautic Cognizance

The following licenses have recently been issued:

License No.	Issued to	Address
334	C. J. Zimmerman,	Keyport, N. J.
343	J. B. Porter,	Wabash, Indiana
377	Leon D. Smith,	Millterton, Pa.
380	Pomilio Bros. Corporation,	New York City.
381	Fort Worth Aerial Transportation Co.,	Fort Worth, Texas.
382	Morse D. Levitt,	New York City.
383	William L. Lamkin,	Porterville, Calif.
384	Northeastern Balloon Co.,	Newburyport, Mass.
385	Lamont A. McDowell,	Elizabeth, N. J.
386	Robert Bruce McGill,	San Francisco, Calif.
387	Harold C. Brooks,	Wabash, Ind.
388	V. P. Hollingsworth,	Wabash, Ind.
389	Henry F. Fawcett,	Wabash, Ind.
390	The Cameron Aerial Co.,	Cameron, Missouri.
391	Joseph M. Pallissard,	Dayton, Ohio.
392	The Curtiss Eastern Airplane Corp.,	Philadelphia, Pa.
393	George H. Watkins,	Cambridge, Mass.
394	Carl H. Duede,	Stuart, Iowa.
395	S. A. Purcell,	San Francisco, Calif.
396	James Dazill McKee,	Pittsburgh, Pa.
397	David R. Baker,	New York City.
398	Alexander Seversky,	New York City.
399	E. Clark Harter,	Wenona, Ill.
400	Arthur W. Fox,	Rockaway, N. J.
401	Everett K. Davey,	Rockaway, N. J.
402	John H. Hughes,	Macon, Georgia.

Aerial League of West Virginia to Aid Loan Campaign

Charleston, W. Va.—A group of citizens, some of whom served as aviators in France during the war, have formed the Aerial League of West Virginia for the purpose of fostering aviation in that state.

The League has offered to supply aviators for the Liberty Loan Committee during the campaign, when it was learned that the arrangement for exhibition flights for large cities could not be effected by the committee for West Virginia, it being considered too inaccessible for transportation of the equipment.

The League's organization embraces the entire state. Lieutenant L. W. Frankley is president of the League, Lieutenant W. Beall vice president, Mr. O. R. Bush treasurer, and Mr. E. M. Arbuckle secretary.

Doctor Orders Curtiss Plane for Making Professional Calls

Beaver City, Neb.—Dr. F. A. Brewster, of this city, is going to make his long professional calls in the future by aeroplane. The aeroplane has been ordered from the Curtiss Aeroplane and Motor Co. It will be piloted by Wade Stevens, of this place, a former lieutenant and instructor in the aviation branch of the army.

Dr. Brewster holds the distinction of being the first physician to purchase a plane for this use. He has a wide practice in Nebraska, and many of his calls make necessary long trips by automobile or train. He believes that the aeroplane will solve for him the question of bad roads and inconvenient train schedules.

Government Building Helium Plant Near Fort Worth

Washington.—A helium plant is being constructed by the Government at North Fort Worth, Tex., to provide helium gas for airships. The plant will cost $900,000. The products of certain natural gas wells in Clay County, Tex., have been found best suited for the extraction of helium, and pipe lines will be arranged to Fort Worth.

Japanese Air Commission Visiting Army Fields

Mineola, L. I., April 21.—Admiral K. Yoshida, Lieutenant Commander Y. Yeyeda, Lieutenant Commanders Kono and Sugi, Professor Subara and Engineer T. Iwaski, members of a Japanese mission who have been visiting army and navy aeronautical stations throughout the country, were at Hazelhurst Field on April 21. Colonel B. M. Atkinson put a squadron of aviators through a series of stunts.

Aero Club Organized in Grand Rapids

Grand Rapids, Mich.—An aeronautical association with a purpose of promoting aerial activity was organized in Grand Rapids recently with a charter membership of thirty-two. It is hoped to arrange for the establishment of a municipal aerial landing place in Grand Rapids in the near future.

B. A. Hathaway was chosen temporary president. R. I. White and Howard Baxter were elected vice presidents; M. Jewell Clark, treasurer; Fred E. Goodall, secretary, and Francis D. Campau, counsel.

Army Balloons Start On Metereological Test Flight

Omaha, Neb., April 17.—Two United States army balloons started at midnight on an experimental flight in high altitudes, with a view to testing meteorological instruments.

Lieutenant Colonel W. S. Wuest, commanding officer at Fort Omaha, and Lieutenant Ralph A. Reynolds accompanied the balloon, which was consigned to an altitude of 5,000 feet. Captain F. W. Goodale and Lieutenant C. L. Leroy Meisinger were in the craft selected to register 10,000 feet.

After being aloft for from forty-eight to seventy-two hours at the selected levels, the airships reported safe landings, one at Cabot, Ark., and the other at Orola, Miss.

Howard E. Coffin Returns

Washington, D. C.—Howard E. Coffin, former chairman of the Aircraft Board, returned to Washington from a trip to Europe, taken to examine aircraft developments and tendencies. He was much impressed by the extensive plans of the European governments for direction and encouragement of aerial transit along both military and commercial lines. Every encouragement is being offered to commercial developments, says Mr. Coffin, and Britain intends, evidently, to seek both the military and commercial supremacy of the air. The elaborateness of the plans being laid for the encouragement and regulation of aviation is quite beyond comprehension on this side of the ocean.

Lieut. S. B. Vrooman, Named in Hughes' Report Exonerated by Attorney General

Washington, D. C.—Attorney General Palmer announced here that there will be no prosecution of Lieutenant S. B. Vrooman, who was declared by the Hughes report on aircraft production to have been regarded as having violated a section of the Criminal Code prohibiting any person acting for the Government in transacting business with a corporation in which he is interested. The Attorney General explains that his action in refusing to prosecute the officer is based on new testimony which entirely satisfies him that Lieutenant Vrooman was in no way responsible for the inspection at the Vrooman plant, and that he is not even technically guilty of having violated the Criminal Code.

"I am quite sure," says the Attorney General's statement, "that if the testimony now before me had been before Justice Hughes and Attorney General Gregory, they would not have reached the conclusion they did.

"Lieutenant Vrooman was in charge of the inspection of propeller lumber, including mahogany. The S. B. Vrooman Company, in which he was financially interested, was one of the companies which furnished such lumber to the Government. It was not claimed that he actually inspected any of the lumber furnished by that company. He did, however, select inspectors, or, at least, the managers of the district offices, who, in turn, selected the inspectors.

"Judge Hughes reported that, because those who did the actual inspection at the Vrooman plant, as well as others, were responsible to him for the efficiency of the inspection, he was the agent of the Government directly responsible for the proper inspection of the mahogany delivered by the S. B. Vrooman Company to the Government, and that acting in the capacity he violated the law. Attorney General Gregory, in transmitting Judge Hughes' report to the President, concurred in the conclusion.

"It appears, however, that Lieutenant Vrooman, after the publication of the report, claimed that neither he nor the men under him were responsible for the inspection at the Vrooman plant. He had testified that all the lumber furnished by this company was furnished under contracts originally made with the British Government, and taken over by our Government, and that the inspection was under the original British contracts, and not under aircraft specifications.

"His claim was that he meant to say that inspection was not only under different specifications, but that it was itself made not by the organization of which he was in charge, but by Inspectors of the National Hardwood Lumber Association, over which he had no jurisdiction. This, evidently, was not what either Judge Hughes or Attorney General Gregory understood from the statements made.

"After Lieutenant Vrooman made his complaint, Attorney General Gregory ordered a further investigation to be made to ascertain whether, in fact, either Lieutenant Vrooman or the men under him had any responsibility for the inspection at the Vrooman plant. This investigation, consisting of the taking of testimony of several witnesses under oath, was not completed in time for Attorney General Gregory to pass on the matter before retiring from office. It is now my duty to institute prosecution against Lieutenant Vrooman unless this additional investigation shows that the claim made by him after the publication of Judge Hughes' report is true.

"I have carefully examined the testimony on this point, and it leaves no doubt that the inspection of the lumber furnished by the Vrooman company to our Government under the British contracts was not made either by Lieutenant Vrooman or by the men under him. It was made by inspectors of the National Hardwood Lumber Association, who were entirely independent of him. The utmost that any man under him did was to receive the inspectors' reports and transmit them to authorities at Washington other than Lieutenant Vrooman.

"Under these circumstances, I am quite sure that if the testimony now before me had been before Judge Hughes and Attorney General Gregory they would not have reached the conclusion they did. The testimony entirely satisfies me that Lieutenant Vrooman was in no way responsible for the inspection at the Vrooman plant, and that he is not even technically guilty of having violated Section 41 of the Criminal Code. This completely vindicates him, and there will be no prosecution."

Curtiss Plane Aids Actors' Fund

Mrs. George McManus, wife of the cartoonist and star in "The Newlyweds" when it was staged, rode over the Polo Grounds during the field day for the Actors' Fund of America on April 13. She accompanied Roland Rohlfs, Curtiss test pilot, in an army training plane, which was donated for the occasion by the Curtiss company. When over the field and from an altitude of 300 feet, Mrs. McManus dropped an autographed baseball which was auctioned off.

Book Review

"How to Build a Scout Monoplane." Compiled by George D. White.

A scout monoplane built in the home workshop. This comprehensive pamphlet is written without use of technical terms so that any young aeronautical enthusiast can readily understand its contents. It treats of wing construction, covering of the wings, streamlining the fuselage, controls, power plant and assembly.

This valuable publication can be purchased at The Aeronautic Library, Inc., 299 Madison Avenue, New York City, at a price of 30 cents, including postage.

© International Film Service

The latest addition to the police force of Venice, California, is an aeroplane. A member of the force has been sworn in as pilot

The AIRCRAFT TRADE REVIEW

Curtiss Company Delivers Planes Under Own Power

Inaugurating a policy which will be followed by the Curtiss Aeroplane and Motor Corp., in delivering aeroplanes to purchasers under their own power, the first MF flying boat was flown to Atlantic City recently. Lawrence Leon, Curtiss pilot, who was instructor in cross-country work and acrobatics for two years at Call Field, piloted the boat. He was accompanied by Ensign James L. Wheeler of the United States Naval Flying Corps.

The start was made from Rockaway at 1 o'clock in the face of a stiff head wind and, after losing their way in the fog, the two pilots arrived at Atlantic City at 3 o'clock.

The boat will be used by the Curtiss Aeroplane Company in carrying passengers. Ensign Wheeler has been engaged by Earle Ovington, president of the Curtiss Aeroplane Company, as pilot.

Standard Parts Officials Back From Service

Capt E. R. Finkenstaedt, formerly active in the production of the Liberty truck for the government at Washington, has resumed his duties as assistant to President Christian Girl. Major Lewis P. Kalb, until recently in charge of designing, testing and specification work in the engineering division of the Motor Transport Corps, has joined the engineering staff of the company as assistant director of engineering, and Capt. A. L. Watts, in charge of the specification and record section of the engineering division of the Motor Transport Corps, has also joined the engineering staff. Both Lieut. Rex Gosling, who before entering service was purchasing agent of the Standard Welding division, and Lieut. Ray Jones, who gave up his position as production manager of the Perfection Spring divisions to enlist in the navy, have returned to their respective plants.

Czecho-Slovaks Purchase $1,000,000 Worth of American Planes

Washington, D. C.—It is reported here that the sale of $319,000 worth of planes and $600,000 worth of equipment recently announced was made to a representative of the Czecho-Slovak government.

Central School of Aviation Has New $100,000 Building

Pittsburg, Kansas.—The Central School of Aviation, at Pittsburg, Kansas, has recently occupied its new $100,000 building. The school is affiliated with the Pittsburg Automobile and Tractor School and incorporated in the State of Kansas.

Two army aviators, Lieutenants Water and Montgomery, have been added to the faculty. Two new planes are being added to the present equipment.

New Detroit Warehouse for Aluminum Company

Detroit.—The Aluminum Co. of America, which leases a warehouse here, is about to build one of its own. A 5-acre site in the northeastern factory district has been purchased and building will start soon.

F. R. Porter, Former Chief Engineer at McCook Field, Now With Curtiss

New York.—F. R. Porter has been appointed chief motor engineer of the Curtiss Engineering Corp., Garden City, L. I., where the experimental work of the Curtiss company is carried on. He has also been appointed chief engineer of the Curtiss Aeroplane & Motor Corp., Buffalo. His headquarters will be at Garden City. For the past year Mr. Porter was chief engineer at McCook Field for the Government, and in that capacity had to handle all new inventions in connection with engines and accessories.

Motor Truck Service and Spare Parts Delivered By Aeroplane

Aerial distribution of repair parts to distributers and service stations for Service trucks has been instituted by the Service Motor Truck Co. of Wabash, Indiana. It will be handled under contract with the Service Aviation Training & Transportation Co., a separate organization formed by stockholders of the Service Motor Truck Co. J. P. Porter, chief pilot, was formerly of the Royal Flying Corps and was one of the instructors at Love Field Aviation Camp, Texas. Assistant pilots are Harold C. Brooks and V. P. Hollingsworth. Oscar Bricker, formerly of Love Field, is in charge of the hangars and landing field. A 44-acre field has been prepared for landing. Curtiss JN-4 planes will be used.

Status of Outstanding Orders and Principal Items of Equipment Issued for Air Service

(Prepared by Statistics Branch, General Staff, War Department, April 12, 1919.)

Includes all articles of equipment on outstanding contracts on March 28, 1919, except aeroplane bombs and clothing.

DELIVERIES OVER 90 PER CENT OF ORDERS

	Orders	Deliveries	Per Cent
De Havilland 4 planes	4,846	4,842	99.9
Compasses	12,650	12,644	99.9
Cameras—gunnery training	1,609	1,599	99.3
Oak lumber (1000 ft.)	311	308	99.0
Balloons, kite, type "R"	910	898	98.6
Spare train propellers	33,631	33,064	98.3
Gum yokes	20,607	20,007	97.1
Oxygen apparatus	6,100	5,609	92.0
Lewis machine guns	43,950	40,294	91 7
Vickers machine guns	18,125	16,366	90.3

DELIVERIES 51 TO 90 PER CENT OF ORDERS

	Orders	Deliveries	Per Cent
Motor lorry outfits	77	69	89.6
Aeroplane fabrics (1000 yds.)	11,568	10,263	88.7
Hispano 180 H. P. engines	6,000	5,075	84.5
Handley P. laminations	2,000	1,660	83.0
Hydrogen cylinders	172,800	142,300	82.3
Cameras—observation	1,351	1,051	77.8
Oxygen tanks	17,000	13,077	76.9
Synchronizing devices	24,226	17,650	72.9
Bomb sights	16,544	11,630	70.3
Bomb releases	15,850	10,362	65.3
Flare bracket holders	23,037	14,542	63.1
Cherry lumber (1000 ft.)	1,006	618	61.4
Gasoline gauges	1,450	858	59.2
Cable (1000 ft.)	3,340	1,720	52.0
Flares	162,248	83,000	51.2
Winches	236	121	51.2

DELIVERIES LESS THAN 51 PER CENT OF ORDERS

	Orders	Deliveries	Per Cent
Cotton tape (1000 yds.)	15,090	7,339	48.6
Balloon fabrics (1000 yds.)	13,764	6,664	48.4
Walnut lumber (1000 yds.)	10,354	4,649	44.9
Mahogany (1000 ft.)	22,352	9,984	44.7
Balloon equipment units	400	87	21.8
Hispano 300 H.P. engines	500	101	19.2

The Curtiss Eastern Aeroplane Company has opened the first aeroplane sales room in Philadelphia. The plane on view is a Curtiss JN-HD-2

U. S. Rubber Profits $16,072,042

New York, N. Y.—The U. S. Rubber Co. announced a record-breaking net profit of $16,072,042 for 1918. Sales increased from $176,159,694 to $215,398,425.

New Standard Parts Factory at Flint

Cleveland.—A new spring factory is under construction for the Standard Parts Co. at Flint. It will replace the company's present Flint plant, long since outgrown. The new factory will have an immediate capacity four times greater than that of the old plant.

Air Service Contracts Cancelled and Suspended, Over $500,000,000

(Prepared by Statistics Branch, General Staff, War Department, April 12, 1919.)

During the week ended April 5, 1919, the total Bureau of Aircraft Production obligations were reduced over $4,000,000, making a total of cancelled and suspended contracts of $500,679,617 since the armistice. The following is a summary of the value of cancellations and suspensions of contracts through April 5, 1919:

	Value	*Per cent of total*
Engines and spare parts	$275,616,187	55
Aeroplanes and spare parts	166,081,004	33
Chemicals and chem. plants	18,334,715	4
Instruments and accessories	10,868,841	2
Balloons and supplies	9,314,963	2
Fabrics, lumber and metals	7,228,778	1
Miscellaneous	13,235,129	3
Total	$500,679,617	

Aeronautical Instrument Co. to Make Claudel Carburetors

The Aeronautical Equipment Co. has contracted with the Claudel Co. of France for the American rights to manufacture the Claudel carburetor. The contract calls for a minimum of 20,000 carburetors for the first year, progressing through a minimum of 100,000 carburetors in the sixth year. The company expects to exceed these figures very considerably.

Personal Pars

Amel R. Carlson, who has completed his government service on the purchasing staff of the Wright-Martin Aircraft Corp., New Brunswick, N. J., has returned as assistant general manager to the Commonwealth Motors Co., Chicago.

LeRoy A. Hillman will be in charge of the branch of the Detroit Pressed Steel Co., which has been opened here for Disteel wheels. Mr. Hillman has been in civilian service with the Bureau of Aircraft Production, and before that operated The Bearings Shop, interest in which he still retains.

M. W. Bartlett, for the past five years secretary of the Splitdorf Electrical Co., has joined the Wire Wheel Corp., of America as Eastern District representative, with headquarters in New York at 835 Eleventh Avenue. Service direction and export matters are also under his supervision.

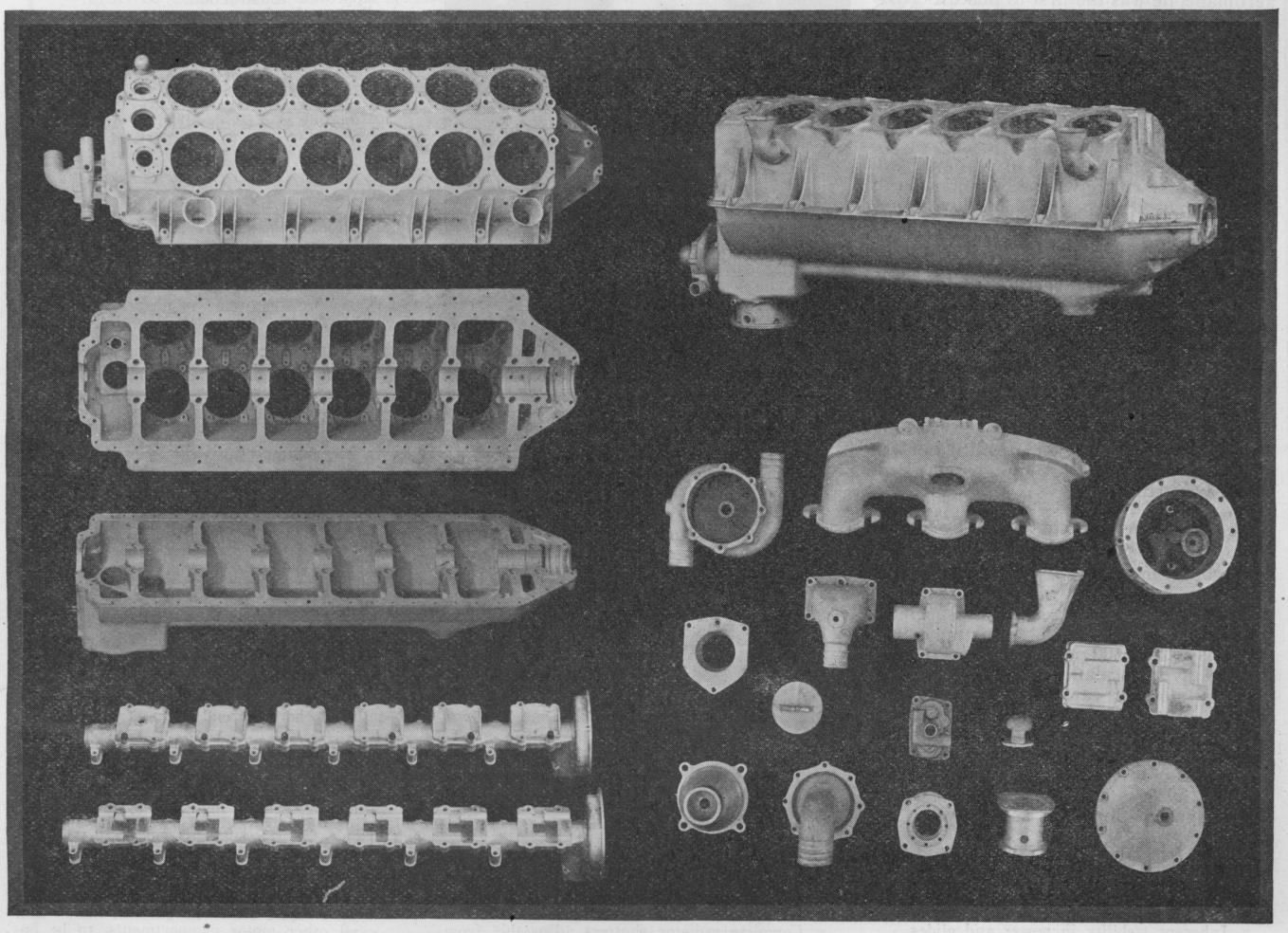
E. O. Bennett, formerly stationed at the research laboratory, National Advisory Committee for Aeronautics, Langley Field, Hampton, Va., is now associated with the engineering department of the Standard Oil Co., San Francisco, Cal.

Walter O. Adams has resigned as plant manager of the Erie Specialty Co., Erie, Pa., and has opened an office at 1038 Dime Bank Building, Detroit, Mich., as mechanical-chemical engineer, specializing in production and sales.

A. L. Clayden has resigned as consulting engineer of the Wright-Martin Aircraft Corporation, New Brunswick, N. J., and will sail shortly for London, where he will open an office as consulting engineer. He plans to specialize in European investigations for American companies in the automotive field, and will spend a portion of each year in this country.

Lee C. Carlton has resigned as Chicago branch manager of the American Bosch Magneto Corporation, and has been appointed mid-West manager of the Ericsson Mfg. Co., with offices in the Century Building, that city.

Charles E. Barton is now associated with the engineering department of the Lincoln Motor Co, Detroit, Mich. He was formerly in the service of the Government, in the Bureau of Aircraft Production, and was stationed at McCook Field, Dayton, Ohio.



The contribution of the Aluminum Castings Company, of Cleveland, to the development of the Liberty Motor. Excellent examples of the castings which this company made

Hon. Albert S. Burleson, Postmaster General
Hon. Otto Praeger, Second Assistant Postmaster General
J. B. Corridon, Superintendent, Division of Aerial Mail Service
Louis T. Bussler, Chief of Maintenance and Equipment

J. Clark Edgerton, Chief of Flying Operations
George L. Conner, Chief Clerk, Division of Aerial Mail Service
Eugene J. Scanlon, Chief of Supplies
Charles N. Kight, Special Representative

PILOTS

Dana C. DeHart
Edward V. Gardner
Robert F. Shank
Ira O. Biffle
Leon D. Smith
Gilbert G. Budwig
Trent C. Fry

John A. Jordan, Superintendent, Western Division
Paul L. Ferron, Manager, Belmont Park
Harry W. Powers, Manager, College Park
Lowell S. Harding, Manager, Bustleton
O. J. Sproul, Manager, Chicago
W. J. McCandlass, Manager, Cleveland

PILOTS

E. Hamilton Lee
Lester F. Bishop
Carroll C. Eversole
Charles I. Stanton
John M. Miller
Max Miller
Charles E. Bradley

Edward V. Gardner

Edward V. Gardner was one of the first civilian pilots in the Postal Aero Mail Service and has served on the Washington, Philadelphia and New York route since the military were replaced by civilian pilots. He has never missed a single trip since entering the service. Though he has flown in all sorts of weather, battling fierce storms and winter gales which at times retarded his flight, he has not once failed to deliver the mail on the New York-Washington route. Piloting a postal aeroplane, he was the first to make a cross-country flight from Chicago to New York in one day. This flight he made in seven hours and forty-six minutes.

Mr. Gardner's home is at Plainfield, Illinois. He began his career of speeding in auto races during 1911, taking part in races on all of the principal tracks in the United States, as a driver of National and Mercer cars, and giving exhibitions until 1915. That year he took up flying, receiving his instruction at the Curtiss School at Hampton, Va. When the war was declared he was employed as civilian flying instructor at Chanute Field, Rantoul, Ill. Until 1917 he was student instructor, and was then promoted to junior instructor and was transferred to Love Field, Dallas, Texas, December 15, 1917. In February, 1918, he was promoted to senior instructor, giving advanced instructions in cross-country flying. Resigning as instructor on August 1, 1918, he was employed as aerial mail pilot by the Post Office Department.

Edward V. Gardner, who has been a mail service pilot since the Post Office Department has employed civilian aviators

Post Office Department Issues Specifications for 10 Mail Planes

Washington, D. C.—The Post Office Department has asked bids for ten mail planes to be built according to specifications, which follow. The minimum capacity is to be 1,500 pounds, but preference will be given to planes having from 2,000 to 3,000 pounds capacity. Bids will be opened June 2, and deliveries to be made within six months after letting contracts. Bidders are to agree to furnish planes in lots of six at the price specified up to June 30, 1920.

The specifications are as follows:

General Requirements

1. *Fundamental Requirements.* Should be a radical departure from military designing, making the following qualities of primary importance:
   a. Inherent stability in power and glides.
   b. Machine to be balanced for cruising speed, altitude 6,000 ft.
   c. Controllability and wide vision.
2. *Performance* (Normal Load).
   a. Efficient cruising speed of 90-100 m.p h. at 6,000 ft.
   b. Cruising radius of 5 to 6 hours.
   c. Buoyancy speed of 50 m.p.h. *or less.*
   d. Low landing speed either inherent or mechanical.
   e. Ceiling of about 15,000 ft.
   f. Capable of horizontal flight or climb on one-half normal maximum power.
3. *General Requirements.*
   a. Two or more motors.
   b. Mail load of 1,500-3,000 lb. at 17½ lb. per cu. ft.
   c. Crew of one pilot and one mechanic on two-motored planes, and two pilots and one mechanic on three-motored planes.
   d. A method of retracting or hinging wings for storage with wing spans over 80 ft. Optional.
   e. Overall height of 18 ft.
   f. To be capable of easy assembly and disassembly.

Detailed Construction

1. *Power Plants.*
   a. To be independent power plants.
   b. Accessible for major repairs or removal.
   c. Accessibility for minor repairs during flight.
   d. An approved motor starter system.
   e. Complete radiator shutters adjustable from pilot's seat.
   f. A compression release to be provided for each motor.
2. *Fuselage.*
   a. Preferably a removable mail cage which may be drawn up into fuselage recess.
   b. Steerable tail skid to be optional with builder.
   c. Two tail skids to be provided in tandem; that is, one behind the other, with universal joints, if practicable.
   d. In flight, fuselage to withstand a loading of 30 lb. per sq. ft. on horizontal tail surfaces and 20 lbs. per sq. ft. on vertical tail surfaces.
   e. Fuselage to have landing factor of safety of 12-15.
   f. Accessibility of all tanks, leads, controls, etc., during flight.
   g. Variable loads at center of gravity.
3. *Wings.*
   a. Approved construction.
   b. Factor of safety of 6.
   c. Extra strength wing skids hinged with shock absorber of rubber.
4. *Landing Gear.*
   a. To have a factor of safety of 15 in all members.
   b. Center of gravity to be as far back of landing gear as possible.
   c. Elimination of any tendency to nose over.
   d. Landing gear to give adequate support to motors.
5. *Controls and Control Surfaces.*
   a. "Dep."
   b. All controls to be readily accessible for maintenance and repair.
   c. All control surfaces to be balanced where necessary for easy handling.
   d. Emergency control to be provided with removable stick.
   e. Variable horizontal stabilizer to be provided and balanced at neutral point with standard load.
   f. Internal controls designed to be free from danger of ice.
6. *Gas and Oil.*
   a. An independent gas and oil supply for each motor, with intercommunication leads.
   b. An absolutely reliable gas feed system such as provided by mechanical vane pumps and central hand pump as auxiliary.
   c. Accessibility to all valves and leads, both oil and gas, for repairs while in flight.
   d. Strongly anchored tanks.
   e. All leads to be protected against vibration.
7. *Safety and Comfort of Crew.*
   a. Pilot and pilot mechanic to be placed behind main leads, or preferably to be placed oved loads in streamline at top of fuselage.
   b. That provisions be made for protection against bad weather.
   c. A passage way to be provided, so that vital parts are accessible to mechanic in flight.
   d. That suitable slideways and eyes be provided for belt and snap hook to be worn by mechanic in making repairs in exposed places.
   e. Suggested that streamlining on exposed power plants be hinged at front and of sufficient width and length to provide shelter for mechanic while working on motor. To be held out by suitable, adjustable strut.
   f. That room be available in control cockpit for map boards, instruments and radio controls.
   g. That a good fire extinguisher system be provided, such as Pyrene or equal, tubed by suitable leads to gasoline tanks and all other motor compartments, to be operated from control cockpit.
   h. That pilot's seat be adjustable in relation to controls.

Atlantic City Hotels Co-operating to Make Convention and Contests Great Success

THE leading Atlantic City hotels are co-operating with the management of the Second Pan-American Aeronautic Exposition and Convention to make a huge success of this international event.

The Hotels listed are co-operating in many ways to make the Convention a success, and have contributed to the $50,000 Trans-Atlantic Flight prizes. We ask those who attend to recognize the assistance of these Hotels by patronizing them. Correspond with them about your accommodations.

By special arrangement AERIAL AGE is privileged to present to its readers a coupon which will entitle them to free admittance to all the aeronautic events to be held at Atlantic City from May First, to June First, including admission to the Steel Pier, where the Convention and Exposition will be held and the Atlantic City Air Port where the Aerial Contests for the sixteen prizes and trophies will start and end.

The Atlantic City Publicity Bureau has quoted and guaranteed the Hotel Rates for this Convention as herein printed.

In order to obtain an "Official Button" which admits to everything, attenders must have both (a) a Hotel or a Privilege Certificate and (b) a Membership in one of the organizations or credentials as described, or the AERIAL AGE Coupon printed below. Those who do not have the "Official Button" will be admitted to the Pier and Field upon payment of the prevailing Fees to the Public.

On arrival at a co-operating Hotel ask for your "Hotel Certificate" which will be given you without charge. If not stopping at a co-operating Hotel, you may secure a "Privilege Certificate" at the Steel Pier for Five Dollars ($5.00) which may be surrendered in lieu of the "Hotel Certificate". Present the "Hotel Certificate" (or a Privilege Certificate) at the Registration Bureau on the Steel Pier, together with your card of membership in either the Aero Club of America, The Aerial League of America, The Pan-American Aeronautic Federation, or the Atlantic City Aero Club, and receive your "Official Button". Army and Navy Officers and members of Military and Naval and Civil Commissions, and holders of the AERIAL AGE Coupon, will present the Hotel (or Privilege Certificate) to receive the "Official Button". Others not already members should pay the Annual Dues of Five Dollars ($5.00) and thus become members of The Aerial League of America. Members must present a "Hotel Certificate" (or a "Privilege Certificate") in order to secure an "Official Button". The "Official Button" will admit to the Steel Pier and the Atlantic City Aviation Field at Chelsea Heights at all times and to other affairs as may be announced.

Apply direct to hotels for reservations. State rate you prefer.

(Tear this coupon off and present to hotel manager)

AERIAL AGE FREE ADMISSION COUPON

The Bearer .....

Name .....

Address .....

is a reader of AERIAL AGE WEEKLY and is entitled to a Hotel Certificate which, when presented at the Registration Office on the Steel Pier, entitles holder to secure an Official Button. This Official Button will secure admission to all aeronautic events to be held on the Steel Pier at the Alantic City Air Port during the month of May, 1919.

G. DOUGLAS WARDROP,
Managing Editor.

A—American Plan
E—European Plan

		Rates by the Day							
		Rooms without Private Bath				Rooms with Private Bath			
		For One Person		For Two Persons		For One Person		For Two Persons	
		In Single Room	In Double Room	In Double Room	In Extra Large Room	In Single Room	In Double Room	In Double Room	In Extra Large Room
Boardwalk	A—Royal Palace	5.00 to 7.00		10.00	11.00	9.00 to 11.00		14.00 to 20.00	
	A—Breakers	6.00	——	12.00	to 15.00	7.00	to 10.00	14.00	to 20.00
	E—Breakers	2.50	——	4.00	to 8.00	4.00	to 7.00	6.00	to 12.00
	A—St. Charles	6.00	7.00	10.00	11.00	8.00	to 12.00	12.00	to 16.00
	A—Haddon Hall	5.00	to 7.00	10.00	to 12.00	7.00	to 10.00	12.00	to 16.00
	A—Chalfonte	5.00	to 7.00	10.00	to 12.00	7.00	to 10.00	12.00	to 16.00
	E—Regent	1.50	2.00	3.00	4.00	3.00	4.00	5.00	6.00
	A—Alamac	7.00	8.00	12.00	14.00	8.00	9.00	14.00	18.00
	E—Alamac	3.00	4.00	5.00	6.00	5.00	6.00	7.00	to 10.00
	E—Apollo	1.50	2.00	2.50	——	2.50	3.50	3.50	——
	A—Traymore	7.00	8.00	——	13.00	9.00	——	14.00	22.00
	E—Traymore	3.00	4.00	——	5.00	5.00	——	6.00	14.00
	A—Brighton	6.00	to 8.00	12.00	to 14.00	8.00	to 11.00	14.00	to 22.00
	A—Marlborough-Blenheim	7.00	8.00	12.00	——	10.00	11.00	14.00	to 21.00
	E—Marlborough-Blenheim	4.00	5.00	7.00	——	7.00	8.00	9.00	to 16.00
	A—Dennis	6.00	to 8.00	9.00	to 11.00	7.00	to 15.00	12.00	to 18.00
	E—Shelburne	3.00	4.00	5.00	6.00	5.00	6.00	8.00	10.00
	A—Ambassador	——	——	——	——	——	10.00	14.00	20.00
	E—Ambassador	——	——	——	——	——	6.00	8.00	14.00
	A—Chelsea	6.00	7.00	11.00	13.00	8.00	10.00	14.00	16.00
Vermont Ave.	A—Touraine	3.50	4.00	7.00	——	5.00	5.00	8.00	——
	E—Touraine	2.00	2.50	3.00	——	3.50	3.50	4.00	——
Oriental Ave.	A—Glenside	3.00	3.50	5.00	6.00	3.50	4.00	7.00	8.00
	E—Glenside	2.00	2.50	3.00	3.50	2.50	3.50	6.00	7.00
Massachusetts Ave.	A—Phillips House	4.00 to 7.00		8.00	to 10.00	——	7.00	10.00	to 12.00
	E—Phillips House	1.50	2.50	3.00	5.00	——	4.00	5.00	6.00
	E—Thurber	1.00	1.50	2.50	3.00	——	——	——	——
New Jersey Ave.	A—Pierrepont	4.00	to 5.00	8.00	9.00	5.00	6.00	10.00	11.00
	E—Lancken Cottage	1.50	2.00	2.00	2.00	——	——	——	——
St. Charles Place	A—Loraine	4.00	——	8.00	9.00	——	——	10.00	12.00
Maryland Ave.	E—Schafer Villa	1.25	——	2.00	2.50	——	——	——	——
Virginia Ave.	A—Blackstone	4.00	4.50	8.00	9.00	6.00	6.50	10.00	12.00
	E—Blackstone	2.00	2.50	3.00	4.00	3.50	4.00	5.00	6.00
	A—Majestic	3.50	4.00	6.00	7.00	——	5.00	8.00	10.00
	E—Majestic	1.50	2.00	3.00	4.00	——	3.50	5.00	6.00
	A—Berkshire Inn	3.00	3.50	6.00	7.00	4.00	5.00	8.00	9.00
	E—Berkshire Inn	1.50	2.00	3.00	4.00	2.50	3.00	5.00	6.00
	E—Romm	1.25	2.00	2.50	3.00	2.00	2.00	4.00	4.50
	A—Whittier	3.50	——	6.00	7.00	——	——	——	——
	E—Whittier	2.00	——	4.00	5.00	——	——	——	——
	A—Victor Hall	——	3.00	5.00	6.00	——	——	——	——
	E—Victor Hall	——	2.00	3.00	4.00	——	——	——	——
	A—Jackson	——	5.00	10.00	12.00	——	7.00	14.00	15.00
	E—Jackson	——	2.50	4.00	5.00	——	4.00	8.00	9.00
	A—Bothwell	4.50	5.00	8.00	9.00	——	——	12.00	14.00
	E—Bothwell	——	——	——	——	——	——	——	——
	A—Wiltshire	4.00	5.00	7.00	8.00	——	——	10.00	12.00
	A—Morton	4.00	5.00	7.00	8.00	——	——	9.00	10.00
	A—Absecon	3.00	3.50	5.00	6.00	5.00	6.00	8.00	9.00
	E—Absecon	1.50	2.00	2.50	3.00	3.00	——	6.00	——
	A—Raymond	3.00	3.50	6.00	7.00	——	——	8.00	9.00
	E—Raymond	1.50	1.50	2.00	3.00	——	——	——	——
	A—New Florence	3.50	4.00	7.00	8.00	——	——	10.00	——
	E—New Florence	1.00	1.50	3.00	4.00	——	——	5.00	——
	A—Grand Atlantic	3.00	3.50	6.00	7.00	——	6.00	8.00	9.00
	E—Grand Atlantic	1.50	2.00	3.00	4.00	——	——	——	——
	A—Shoreham	2.50	3.00	5.00	6.00	4.00	5.00	8.00	10.00
	E—Shoreham	1.50	1.50	2.50	3.00	2.50	3.00	5.00	6.00
	A—Calvert	3.50	4.00	6.00	8.00	5.00	5.50	9.00	10.00
	E—Calvert	1.50	2.00	3.00	4.00	3.00	3.50	5.00	6.00
Pennsylvania Ave.	A—Holmhurst	4.00	to 5.00	10.00	12.00	——	——	12.00	14.00
	E—Holmhurst	2.50	3.00	——	5.00	——	——	6.00	7.00
	A—Upton	3.00	3.50	5.00	6.00	——	——	——	——
	A—St. Clare	3.00	4.00	6.00	7.00	——	5.00	10.00	12.00
North Carolina Ave.	A—Colonial	3.00	4.00	5.00	6.00	3.50	5.00	6.00	7.00
South Carolina Ave.	A—DeLancey-Lakewood	3.00	——	5.00	——	——	——	——	——
	E—Rose Lynn	1.00	1.50	2.00	2.50	——	——	——	——
	A—Silverside	3.00	3.50	6.00	7.00	——	——	——	——
	A—Radnor	2.00	2.50	4.00	5.00	——	——	——	——
	E—Radnor	1.00	1.50	2.00	3.00	——	——	——	——
	A—Mullica	2.50	3.00	5.00	6.00	——	——	——	——
	E—Mullica	1.00	2.00	3.00	4.00	——	——	——	——
	A—Trexler	3.00	4.00	5.00	6.00	——	——	——	——

A—American Plan
E—European Plan

Rates by the Day

		Rooms without Private Bath				Rooms with Private Bath			
		For One Person		For Two Persons		For One Person		For Two Persons	
		In Single Room	In Double Room	In Double Room	In Extra Large Room	In Singl Room	In Double Room	In Double Room	In Extra Large Room
	A—Iroquois	4.00	7.00	7.00	8.00	—	—	9.00	10.00
	A—Princess	4.00	5.00	8.00	9.00	—	—	—	—
	E—Princess	1.00	1.50	2.00	3.00	—	—	—	—
Ocean Ave.	A—Bon Air	2.75	3.00	5.50	5.50	—	—	—	—
	A—Kingston	3.00	3.50	5.00	6.00	4.00	5.00	7.00	8.00
	E—Kingston	1.50	2.00	2.50	3.00	2.50	3.50	4.00	5.00
Tennessee Ave.	E—National	1.50	2.00	2.00	3.00	—	—	5.00	5.00
	A—Elberon	2.50	3.00	5.00	6.00	3.00	3.50	7.00	8.00
	E—Elberon	1.00	1.50	2.00	3.00	1.50	2.00	3.00	4.00
	A—Continental	3.50	4.00	7.00	8.00	5.00	6.00	7.00	10.00
	E—Continental	1.50	2.00	2.00	3.00	2.50	3.00	5.00	6.00
	E—Fredonia	1.00	1.50	2.00	2.50	1.50	2.00	3.00	4.00
	A—Greater Pittsburgh	2.50	3.00	4.00	5.00	—	—	—	—
	E—Greater Pittsburgh	1.50	2.00	2.00	3.00	—	—	—	—
	A—Beaumont	—	—	5.00	—	—	—	—	—
	E—Beaumont	—	—	2.00	—	—	—	—	—
	A—Howard House	2.50	—	5.00	6.00	—	—	—	—
	E—Howard House	1.50	—	2.50	3.00	—	—	—	—
	A—Kenderton	3.00	3.50	5.00	to 8.00	—	5.00	8.00	9.00
	E—Kenderton	1.00	1.50	2.50	to 4.00	—	3.00	4.00	5.00
St. James Place	A—Flanders	3.00	—	5.00	—	—	—	—	—
	A—Elwood	3.00	3.50	5.00	6.00	3.50	—	6.00	—
	E—Elwood	1.50	2.00	3.00	4.00	2.50	—	4.00	—
	A—Devonshire	3.50	4.00	7.00	—	—	—	8.00	—
	A—Thompson	—	2.50	4.00	5.00	—	—	—	—
New York Ave.	E—Breslin	2.00	3.00	3.00	5.00	2.50	—	6.00	—
	A—Netherland	2.50	3.00	5.00	6.00	4.00	5.00	8.00	9.00
	A—Chester Inn	2.50	3.00	5.00	6.00	3.00	3.50	6.00	7.00
	E—Chester Inn	1.50	2.00	3.00	4.00	2.50	3.00	5.00	6.00
	E—Hygeia	1.00	1.00	2.00	2.00	1.50	1.50	2.50	2.50
	E—Bingham	1.00	1.00	2.00	2.00	1.50	1.50	2.50	2.50
	A—Belleville	2.50	3.00	5.00	5.50	—	—	—	—
	E—Belleville	1.00	1.50	2.00	2.50	—	—	—	—
Kentucky Ave.	E—Martinique	2.00	2.50	3.00	4.00	5.00	6.00	7.00	8.00
	A—New Clarion	3.00	3.50	5.00	6.00	3.50	4.00	6.00	to 8.00
	E—New Clarion	1.50	2.00	2.00	3.00	2.00	2.50	3.00	3.50
	A—De Ville	3.00	—	6.00	7.00	—	5.00	—	9.00
	A—Monticello	3.50	4.00	6.00	7.00	5.00	6.00	8.00	9.00
	E—Monticello	1.50	2.00	2.50	3.00	3.00	4.00	4.00	5.00
	A—Wellsboro	2.50	3.00	5.00	6.00	4.00	5.00	6.00	7.00
	E—Wellsboro	1.00	1.50	2.00	3.00	3.00	4.00	4.00	5.00
	A—Westminster	3.00	3.50	5.00	6.00	4.00	5.00	7.00	8.00
	E—Westminster	1.50	2.00	3.00	4.00	2.00	2.50	4.00	5.00
	E—Strathhaven	1.00	2.00	1.50	2.50	2.00	2.50	3.00	4.00
	A—Silverton	2.50	4.00	—	—	—	—	—	—
	E—Silverton	1.50	2.50	—	—	—	—	—	—
	A—Richmond	3.00	4.00	6.00	8.00	—	—	—	—
	E—Richmond	1.50	2.00	3.00	4.00	—	—	—	—
	A—Carnix	2.00	—	4.00	—	—	—	—	—
	E—Carnix	1.50	—	2.00	—	—	—	—	—
Illinois Ave.	A—Craig Hall	3.50	4.50	6.00	7.00	4.50	5.50	7.00	9.00
	E—Merle Cottage	1.00	1.50	2.00	3.00	2.00	3.00	—	—
	E—N L Burkhard—125	1.00	1.50	2.00	2.50	—	—	—	—
Park Place	A—Glaslyn-Chatham	3.50	—	6.00	7.00	5.00	—	7.00	8.00
	A—Cheltenham-Revere	3.50	4.00	6.00	7.00	—	6.00	9.00	10.00
	A—Runnymede	3.50	4.00	7.00	8.00	6.00	6.00	10.00	12.00
Michigan Ave.	A—Pennhurst	3.50	5.00	7.00	8.00	7.00	8.00	10.00	12.00
	A—Arlington	3.00	3.50	5.00	6.00	5.00	6.00	8.00	9.00
	E—Arlington	1.50	2.00	2.50	3.00	—	—	—	—
	A—Edison	—	3.00	5.00	6.00	4.50	5.00	7.00	—
	E—Edison	—	2.00	2.50	4.00	3.00	3.50	4.00	—
	E—Bayard	—	1.50	3.00	4.00	—	4.00	5.00	6.00
	E—St. Francis	1.00	1.50	2.50	3.00	—	2.50	4.00	4.50
	A—Colwyn	2.00	2.50	4.00	5.00	—	—	—	—
	E—Colwyn	1.00	1.50	2.00	3.00	—	—	—	—
Arkansas Ave.	E—Terminal	1.00	2.00	2.00	3.00	3.50	4.00	4.00	5.00
	A—Emmett	2.00	2.50	4.00	4.50	—	—	—	—
	E—Emmett	75	1.00	1.50	2.00	—	—	—	—
Missouri Ave.	A—Worthington	2.50	to 3.00	—	—	—	—	7.00	—
Pacific Ave.	E—Y M. C. A.	1.00	—	1.50	—	(For members only.)			
	A—Godwin (1510)	2.00	3.00	4.00	5.00	—	—	—	—
	E—Godwin	1.00	1.50	2.00	4.00	—	—	—	—
	A—Arondale (1514)	2.00	2.50	4.00	5.00	—	—	—	—
	E—Arondale	1.00	1.50	2.00	2.50	—	—	—	—
	A—Channell	2.50	2.75	4.50	5.00	3.00	3.25	6.00	6.00
	E—Channell	1.00	1.25	2.00	2.50	1.50	1.75	3.00	3.00
Arctic Ave.	A—Wright's Hotel (Colored)	4.00	—	8.00	10.00	—	—	—	—
	E—Wright's Hotel (Colored)	1.50	—	3.00	5.00	—	—	—	—
	A—Ridley's Hotel (Colored)	2.00	4.00	4.00	5.00	—	—	—	—
	E—Ridley's Hotel (Colored)	1.00	2.00	2.00	2.50	—	—	—	—

ORGANIZATION CHART

AVIATION SECTION, POLICE RESERVE SQUADRON

POLICE DEPARTMENT, CITY OF NEW YORK

240 CENTRE STREET, NEW YORK CITY.

CHIEF OF AERIAL POLICE
Colonel Jefferson DeMont Thompson

DEPUTY CHIEF
Major S. Herbert Mapes

PERSONNEL ADJUTANT
Captain William Menkel

COMMANDING OFFICER
Major Granville A. Pollock

ADJUTANT
Captain Theodore Arter

GROUND SECTION

FLYING SECTION

ENGINEER OFFICER - 6 MECHANICS
J. G. Stuart

1		4	
2		5	
3		6	

INTELLIGENCE & PHOTOGRAPHIC OFFICER

QUARTERMASTER & COMMISSARY OFFICER
Jack Grodner — Wm. J. Lee

RADIO OFFICER
R.M. Butler

SUPPLY OFFICER
John Robertson Hoyt

ORDNANCE OFFICER
Captain Gordon Baker

CHAPLAIN

CHIEF SURGEON - MEDICAL CORPS

1		4	
2		5	
3		6	

APPROVED BY	
COMPILED BY	MAJOR S. HERBERT MAPES

SQUADRON A - 8 PILOTS
Lieutenant Hilbert L. Bair

1	Wm. E. Skillman	5	F.J. Sweeney
2	Edgar H. Garland	6	Edward L. Smith
3	A. P. Taliaferro Jr	7	Joseph E. Morris
4	Hugh Elasser	8	E. H. Jewell

SQUADRON B - 8 PILOTS
Lieut. Frank Sefern Ennis

1	Miles E. Kellin	5	Howard B. Norton
2	J. William Frost	6	Hugo Sundstedt
3	Lieut. C.W. Kerwood	7	Wm. L. Purcell
4	James I. Crafts	8	E. C. Rowan

SQUADRON C - 8 PILOTS
Lieutenant Charles S. Jones

1	J. R. McCaffrey	5	Edward P. Frost
2	Lieut P. Micelli	6	E. C. Lobdell
3	Capt. J. C. Stehlin	7	Francis P Smith
4	Charles Siems	8	Leonard E. Mins

SQUADRON D - 8 PILOTS
Lieutenant Charles W. Myers

1	Lieut. Leigh J. Bair	5	Paul J. Hagren
2	Lester F. Bishop	6	W. H. Hamilton
3	J. B. Blandford	7	Dean Ivan Lamb
4	Lieut S. J. Mustain	8	G. C. Langstroth

SQUADRON E - 8 OBSERVERS
Horace Keane

1	Lieut. H. Kellerman	5	L.L. Petticord
2	Stephen H. Kelly	6	J. A. Roe, Jr.
3	Lieut C.R. Collins	7	Lieut. J. A. Ronan
4	Lieut. H.A. Peterson	8	Lieut. A.H. Smith

THE BRITISH A. B. C. AERO ENGINES

IT is now possible to publish preliminary descriptions and photographs of the three different A.B.C. aircraft engines. The whole of these have been developed during the war, although it is not believed that the Gnat was originally intended for the propulsion of aircraft. The outstanding feature of the A.B.C. models is the copper coating of the cooling fins. It was not believed possible at one time to construct an efficient, air-cooled engine of greater cylinder bore than 4½ in., owing to the difficulties of cooling which were encountered. Judging, however, from practical results, the A.B.C. will eventually enable the economical use of much larger air-cooled cylinders than have previously been possible.

The Gnat (Mark 2) engine is of the two-cylinder, horizontally opposed type of 4¾ in. bore by 5½ in. stroke. Operating at the normal speed of 1,800 r.p.m., an output of 45 h.p. is obtained, 50 h.p. being possible at the maximum speed of 2,000 r.p.m. Running at its normal speed, the engine consumes

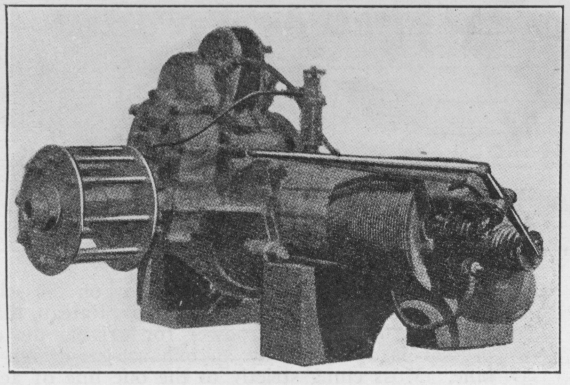


Fig. 1. Three-quarter side view of 45 H.P. "Gnat II"

0·56 pints of petrol per b.h.p. per hour, and 0·037 pints of oil per b.h.p. per hour—a very satisfactory performance for an air-cooled engine. The weight of this engine, complete, is 115 lb., corresponding to a specific weight of 2·3 lb. per b.h.p.

The Wasp (Mark 2) engine is of the seven-cylinder fixed radial type of 4¾ in bore by 6¼ in. stroke, developing a normal output of 200 h.p. at 18,000 r.p.m. Two carburetors

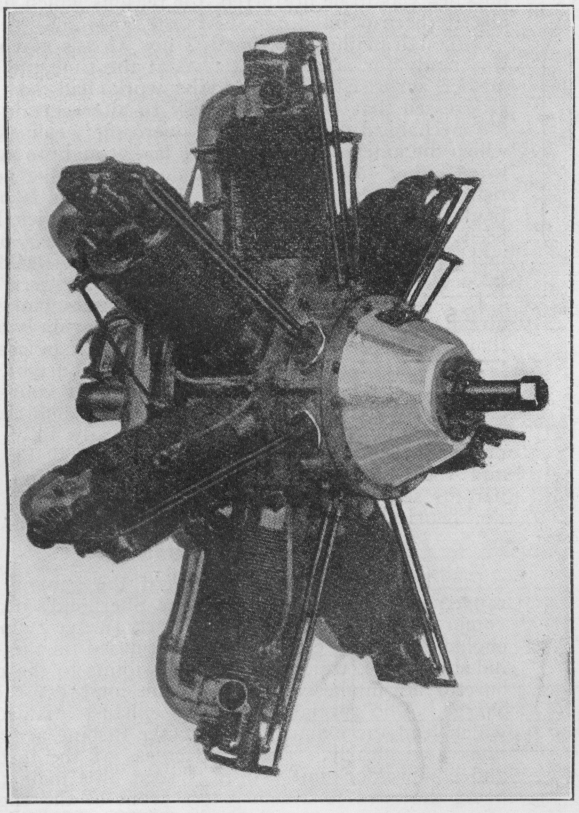


Fig. 2. 170 H.P. "Wasp I"

are fitted, feeding into a circular induction manifold from which separate radial pipes lead to each cylinder. The weight of this engine is 320 lb., giving 1·6 lb. per b.h.p.

The A.B.C. Dragon Fly (Mark A1) is also of the fixed radial air-cooled type, but of nine cylinders, each 5½ in. in

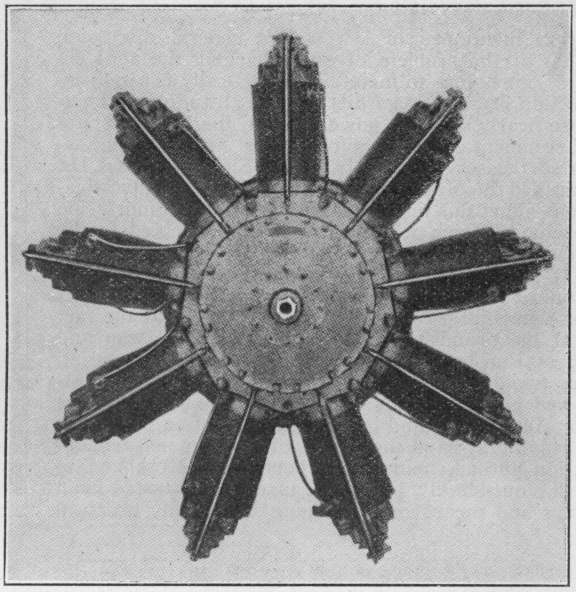


Fig. 3. Front view of 350 H.P. "Dragon Fly"

bore by 6½ in. stroke, and normally developing 340 b.h.p., at 1,650 r.p.m. The weight of this model is 600 lb., corresponding to approximately 1¾ lb. b.h.p. The fuel consumption of both the Dragon Fly and the Wasp are substantially the same as for the Gnat, given above.

Very little information is, so far, available concerning the detailed construction of the A.B.C. engines. The copper coating of the steel cylinders has already been referred to. Beyond

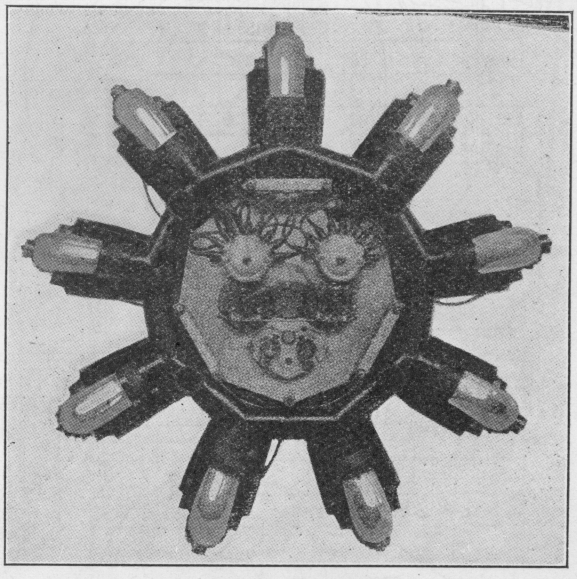


Fig. 4. Rear view of 350 H.P. "Dragon Fly"

this it is possible to say that each cylinder carries three valves in the head—two small valves for the exhaust, one large for the inlet—the exhaust valves communicating directly with the open air, no arrangements for exhaust manifolds being provided. Lubrication in the Wasp and the Dragon Fly is by forced feed through the hollow crankshaft to the crankpin, and thence by combined centrifugal force and splash. Circulation of the oil is maintained by a special type of rotary plunger pump, two pumps being used in the two larger models and one pump in the Gnat (in this model lubrication is by splash throughout). The construction of these engines will be rendered somewhat more clear by reference to the illustrations.

MAINTAINING CONSTANT PRESSURE BEFORE THE CARBURETORS OF AERO ENGINES REGARDLESS OF THE ALTITUDE

By LESLIE V. SPENCER, M.E.

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AS mentioned in last week's general discussion of the problem of supercharging the aero engine so as to maintain a practically constant induction pressure regardless of the altitude, and therefore nearly uniform power output, the United States government soon after our entry into the war secured the services of Mr. E. H. Sherbondy and Dr. Sanford A. Moss to carry on independent investigations along this line, and to design super-compression machines which would be especially adapted to the Liberty twelve-cylinder engine.

It is doubtful if this line of experimental work would have been inaugurated so early in our aircraft experimental program if it had not been for the fact that the promising results which Prof. Rateau and other European experimenters had secured during the two or three years previous had not been followed closely by our National Advisory Committee for Aeronautics and by the government engineers.

Having at hand the results of previous experimentation abroad, neither Sherbondy nor Moss had to strike out blindly, but in the main concentrated upon ways and means of developing thoroughly practical machines or systems based primarily on the scheme of supercharging originated by Prof. Rateau, that is, a system in which the power for driving the compressor is furnished by an exhaust-gas-driven turbine. Moss clung strictly to the one line of action, whereas Sherbondy studied the problem also from the angle of driving the compressor by a shaft from the engine through the intermediary of a set of gears which served to step up the speed to that required for the operation of the compressor impeller. Thus he not only designed several supercharging apparatuses utilizing the Rateau principle, but he also laid out geared designs. Only the former were built, however, as Sherbondy soon became convinced that the utilization of the exhaust gas energy for driving the impeller was to be preferred, for reasons which have already been pointed out.

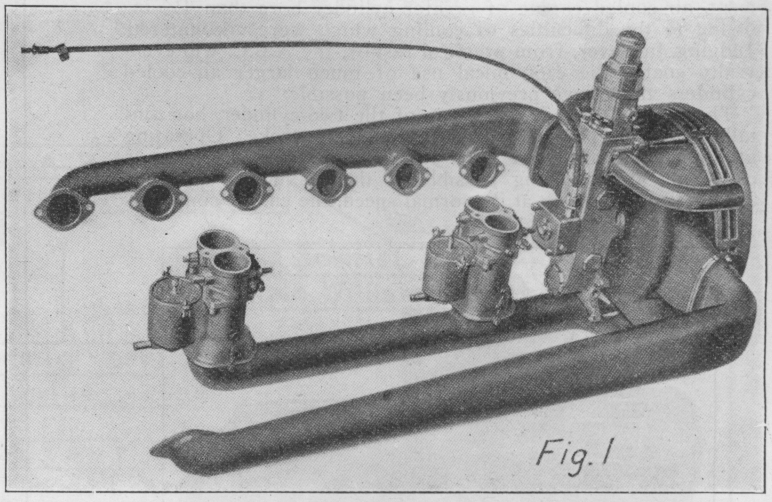


Fig. 1

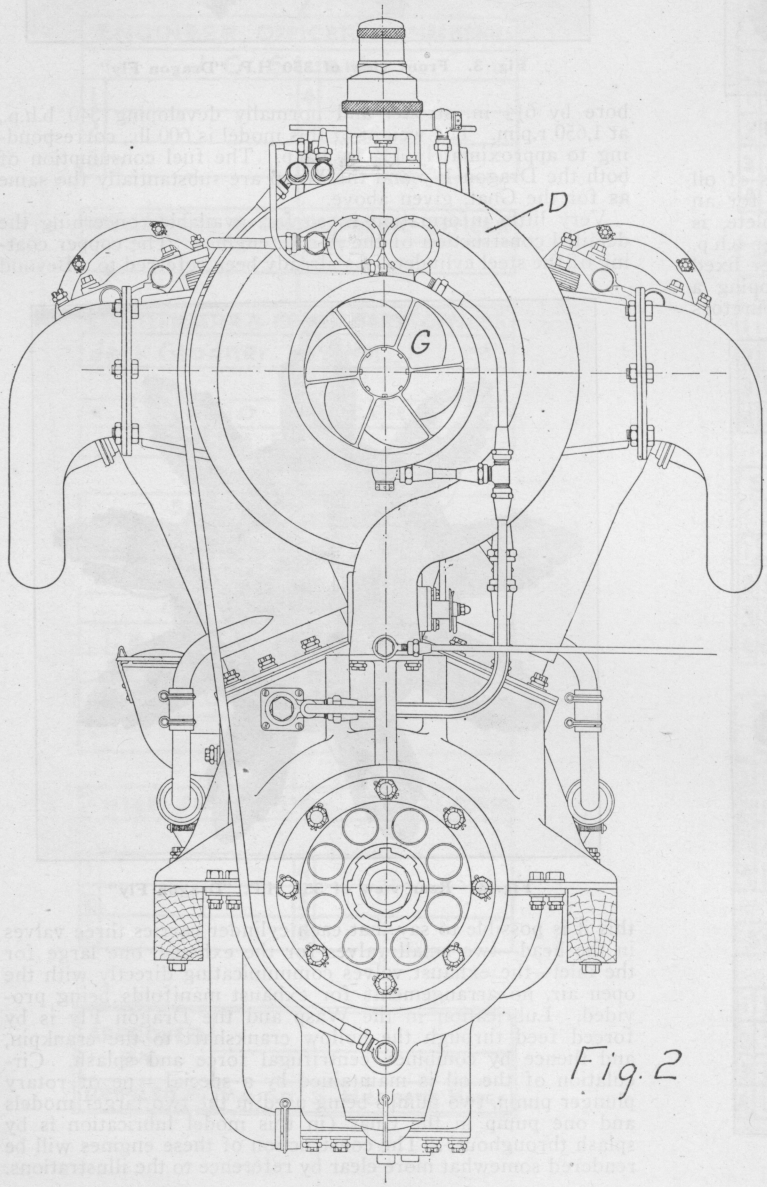


Fig. 2

Although neither Sherbondy's nor Moss's machine was ready for actual flight tests at the time the armistice surprised the world, the work had so far progressed that it remained only to alter certain of the mechanical details so as to overcome weaknesses which the extensive ground tests had brought to light, when either machine would undoubtedly have been ready for preliminary trial in the air. This is particularly true of the Moss supercharger, which has been subjected to gratifying altitude tests on a portable dynamometer at the summit of Pike's Peak—a little over 14,000 feet above sea level.

If the work of European experimenters had not already convinced the aeroplane engineering world that there is great advantage to be gained by maintaining a constant pressure before the carburetor regardless of the altitude—within limits, of course—these altitude tests of the Moss device would have proved it. The advantages being already fully appreciated, due to the earlier tests in England, France and Italy, the results obtained with the Moss apparatus served to further strengthen the validity of the theories back of the idea.

The Sherbondy Superchargers

Fig. 1 gives a very clear idea of the general arrangement of the apparatus of the Sherbondy turbo-compressors as laid out for the Liberty twelve-cylinder engine. The two carburetors are carried on the one induction pipe, which has air-tight joints to the carburetor air intakes and also to the compressor discharge. The specially-designed exhaust manifolds which lead the exhaust gases to the turbine are also illustrated clearly. The compactness of the turbine and compressor unit proper is seen, this main part being designed to attach to the front of the engine without interfering with the normal position of the propeller. Installation of the turbo-compressor here

means that the radiator must be put elsewhere than at the front, most probably in the wings.

At the rear of the turbine housing is the automatic control mechanism, which serves to maintain the turbine speed at the right value to supply the correct supercharge under any atmospheric conditions up to the limit of about 20,000 feet, which is the maximum height for which the Sherbondy machine is intended to be effective.

As already explained, the turbine rotor and the air impeller

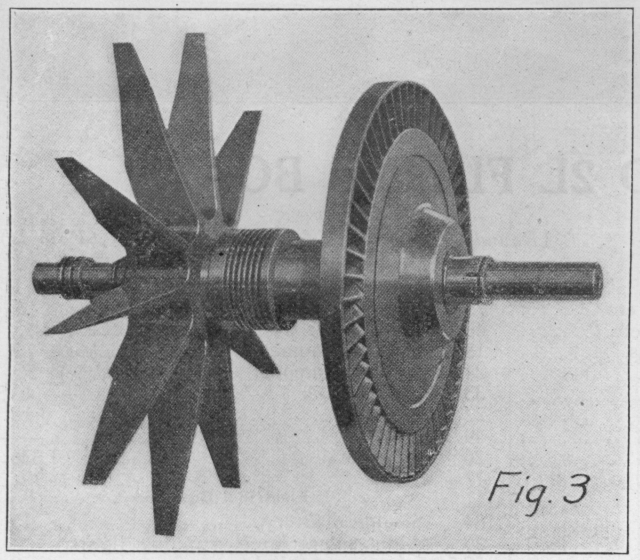


Fig. 3

are direct-connected on the same shaft, a labyrinth arrangement being constructed on the shaft between the two rotating members to prevent pressure leakage between the compressor chamber and the turbine. The rotating part of the device is shown in Fig. 3.

Fig. 4 is a sectional drawing of Mr. Sherbondy's last supercharger, in which a number of minor changes were made over the two previous designs in order principally to overcome the troubles due to the warping of the thin-gage parts of the two earlier constructions. The impeller A is inclosed in an aluminum housing H, which, throughout the length of the impeller blades follows the same taper, and is carefully machined inside to maintain a constant clearance between blades and housing of only twenty-five thousandths of an inch. The housing has the same taper as the blades out to a diameter a little larger than that of the impeller, where its sides become parallel for about another inch. This space acts as a diffusion chamber, after which the housing opens into an outer chamber C of circular section. This outer chamber is of constantly increasing diameter, tapering from an area of almost nothing until it finally reaches the area of the induction pipe. This may perhaps be better understood by referring to the front elevation drawing in Fig. 2 which shows the outer chamber D very clearly. The point of juncture with the induction pipe is shown at J in Fig. 4.

The impeller has ten blades and is 9 inches in diameter. The blades are tapered from a point a little over half way out on the air intake side, and converge to a relatively narrow tip width, as seen in the drawing. The entering edge of the blades is rounded off to prevent air shocks.

A most interesting feature is the turbine rotor, which in the latest Sherbondy design is fitted with seventy-two buckets cut by a special process to the greatest accuracy. As will be readily appreciated, the buckets all had to be of exactly the same weight so as to prevent unbalance of the rotor—a condition which would be very serious at the high speeds which the device is designed to attain. These buckets are assembled into sockets accurately machined in the periphery of the rotor proper, and expansion under the heat of operation serves to hold them in place most securely.

Much research and experimentation was carried on by Mr. Sherbondy before he was able to fix upon an alloy which would be sufficiently strong and of a high enough heat-resistant quality to withstand the very high temperatures and stresses encountered in operation of the device.

The turbine rotor was designed for an angular velocity of 780 feet per second, which means a rotative speed of 31,050 revolutions per minute. The turbine nozzle angle is 21° 45′, and that of the buckets, 35° 15′, with a gas velocity at entrance designed to be about 1950 feet per second, and that at exit from the buckets, 750 feet per second. This is a ratio of a little over 2.5 to 1.

In designing the air inlet, it was desired to prevent all air shock so far as possible, and therefore the conical air inlet G, Figs. 2 and 4, was provided with radial guide vanes which impart a certain velocity to the air and give it direction also before it comes in contact with the rapidly-rotating impeller blades.

The designing of the bearings was also a tough problem, for they must withstand a variety of severe conditions in service, especially when the device is operating at or near its maximum effective speed. Reference to L and L_1 in Fig. 4 will give an idea of the details of their construction. The rear bearing L_1 is subjected to most serious conditions in this design, in that it is in the path of the exhaust gases, whereas the front bearing L is in the center of the air inlet part and is under no severe heat conditions. Both bearings are constructed with spherical seats, which allow them to compensate automatically for any misalignment of the assembly, a possibility should the castings warp to any extent under the high temperatures. They are in effect small self-aligning bearings. The bearing proper between shaft and housing is of plain babbitt. At the front there is, in addition to the bearing just mentioned, a marine type thrust bearing which holds the rotating member against end thrust caused by the pressure of the gages going through the nozzles against the buckets of the rotor.

Pressure feed is used for efficient lubrication of both bearings, which are provided with an excess over actual requirements for obvious reasons. This oil is intended to be forced

(*Continued on page* 356)

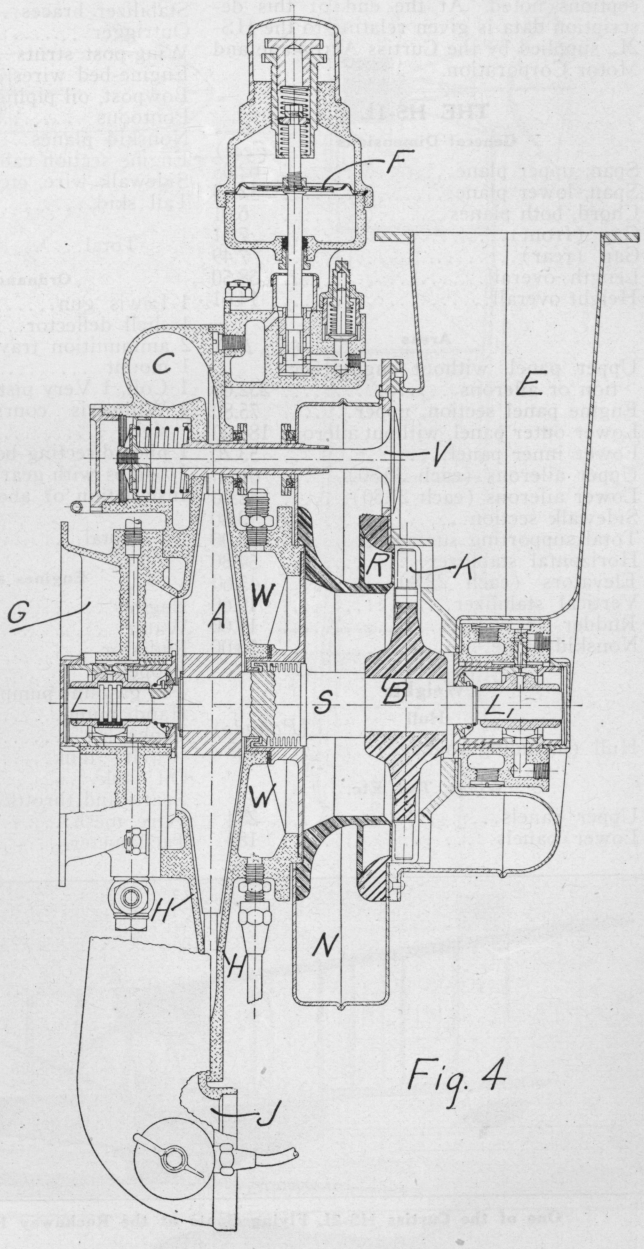
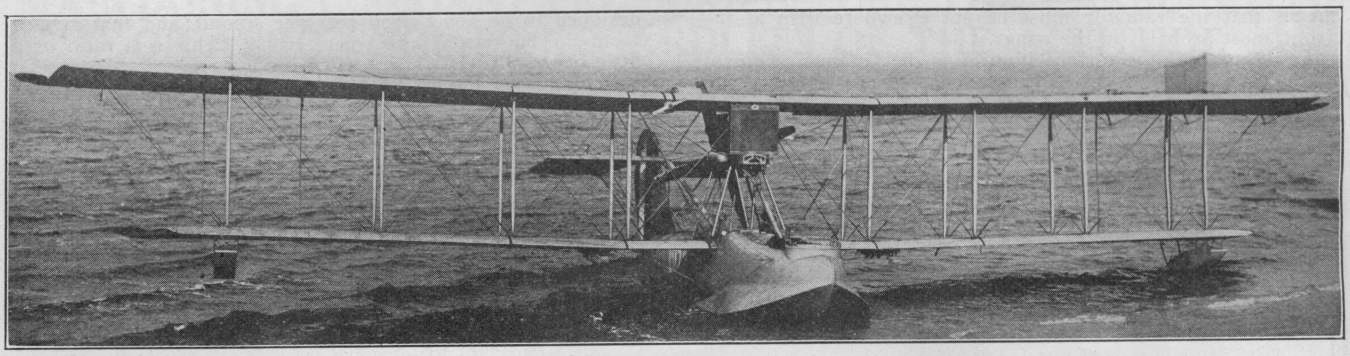


Fig. 4



THE NAVY HS-1L AND 2L FLYING BOATS

FOR coastal patrol duties, the HS-1L and 2L Flying Boats were put in quantity production by the United States Navy Department. Both types are equipped with a single Liberty engine; the HS-2L is 12 feet greater in span than the 1L, but otherwise the machines are similar.

Data and drawing of the HS-1L as built by the Standard Aero Corporation applies to the other machine, with the exceptions noted. At the end of this description data is given relating to the HS-2L, supplied by the Curtiss Aeroplane and Motor Corporation.

THE HS-1L

General Dimensions

	(*Feet*)
Span, upper plane	62.05
Span, lower plane	52.14
Chord, both planes	6.01
Gap (front)	7.51
Gap (rear)	7.49
Length overall	38.50
Height overall	14.61

Areas

	(*Sq. Ft.*)
Upper panel, without engine section or ailerons	232.00
Engine panel section, upper	75.80
Lower outer panel, without ailerons	184.00
Lower inner panel	53.20
Upper ailerons (each 30.80)	61.60
Lower ailerons (each 21.30)	42.60
Sidewalk section	3.80
Total supporting surface	653.00
Horizontal stabilizer	54.80
Elevators (each 22.80)	45.60
Vertical stabilizer	19.60
Rudder	19.60
Nonskid plane	16.00

Weights

Hull

	(*Pounds*)
Hull (including soakage)	1,265

Wings, Tail, Etc.

	(*Pounds*)
Upper panels	284
Lower panels	184
Engine section	106
Sidewalks	72
Ailerons upper braces, etc	75
Ailerons lower braces, etc	40.5
Aileron connecting rods	15
Rudder, etc	24
Elevator, control, etc	33
Vertical stabilizer	22
Horizontal stabilizer	49
Stabilizer braces	26
Outrigger	17
Wing-post struts	111
Engine-bed wires, etc	184
Bowpost, oil piping	29
Pontoons	58.5
Nonskid planes	16
Engine section cables	37
Sidewalk wire, etc	13
Tail skid	4
Total	1,400

Ordnance Equipment

	(*Pounds*)
1 Lewis gun	19
1 shell deflector	3
2 ammunition trays	20
1 mount	25
1 Colt, 1 Very pistol, rockets, etc.	22.5
1 Wimperis course-setting bomb sight	5.8
1 pilot directing bomb sight	26.7
2 bombs with gear	378
Installation of above	60
Total	560

Engines and Equipment

	(*Pounds*)
Engine	806
Water	114.5
Radiator	83
Propeller	70
Fan gasoline pump	18
Hand pump	5
Tanks	120
Gravity tank	31
Oil tank	18
Spark and throttle	2
Wire mesh	8
Tachometer	11
Oil pressure gauge	1
Thermometer	1
Gasoline sight	1
Tools and spare parts	15
Oil Thermometer	1
Radiator support	5
Hand crank	13.5
Exhaust	12
Total	1,336

Electrical Equipment

	(*Pounds*)
Storage battery	15
Aldis signal lamp, running lights, instrument lights	9
Switchboard	3
Wiring for electrical instruments	10
Intercommunication set	10
Installation of above	6
Total	53

Accessories

	(*Pounds*)
Bilge pump	10
Sea anchor	15
Air-speed meter	5
Inclinometer	1.3
Fire extinguishers (2)	14
Installation of above	6.7
Total	52

Navigation Equipment

	(*Pounds*)
Compass	4
Watch	1
Altimeter	2
Chart Board	3
Flags	2
Food and water	10
Pigeons	5
Binoculars	2
Installation of above	3
Total	32

Personnel and Fuel

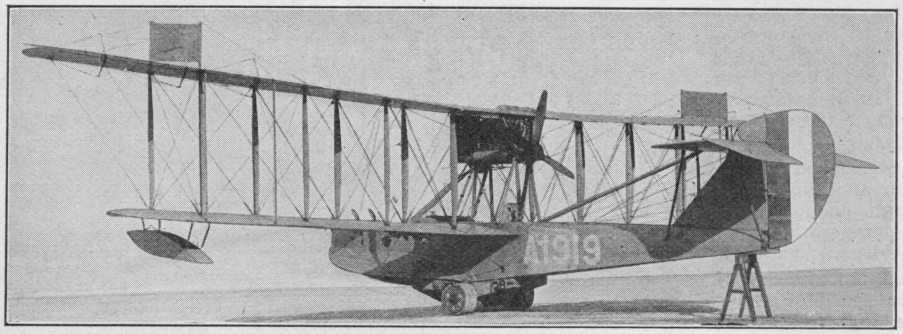
	(*Pounds*)
Crew (2 men, at 180 lbs.)	360
Gasoline (110 gallons) and oil (6) gallons)	730
Total	1,090

Miscellaneous

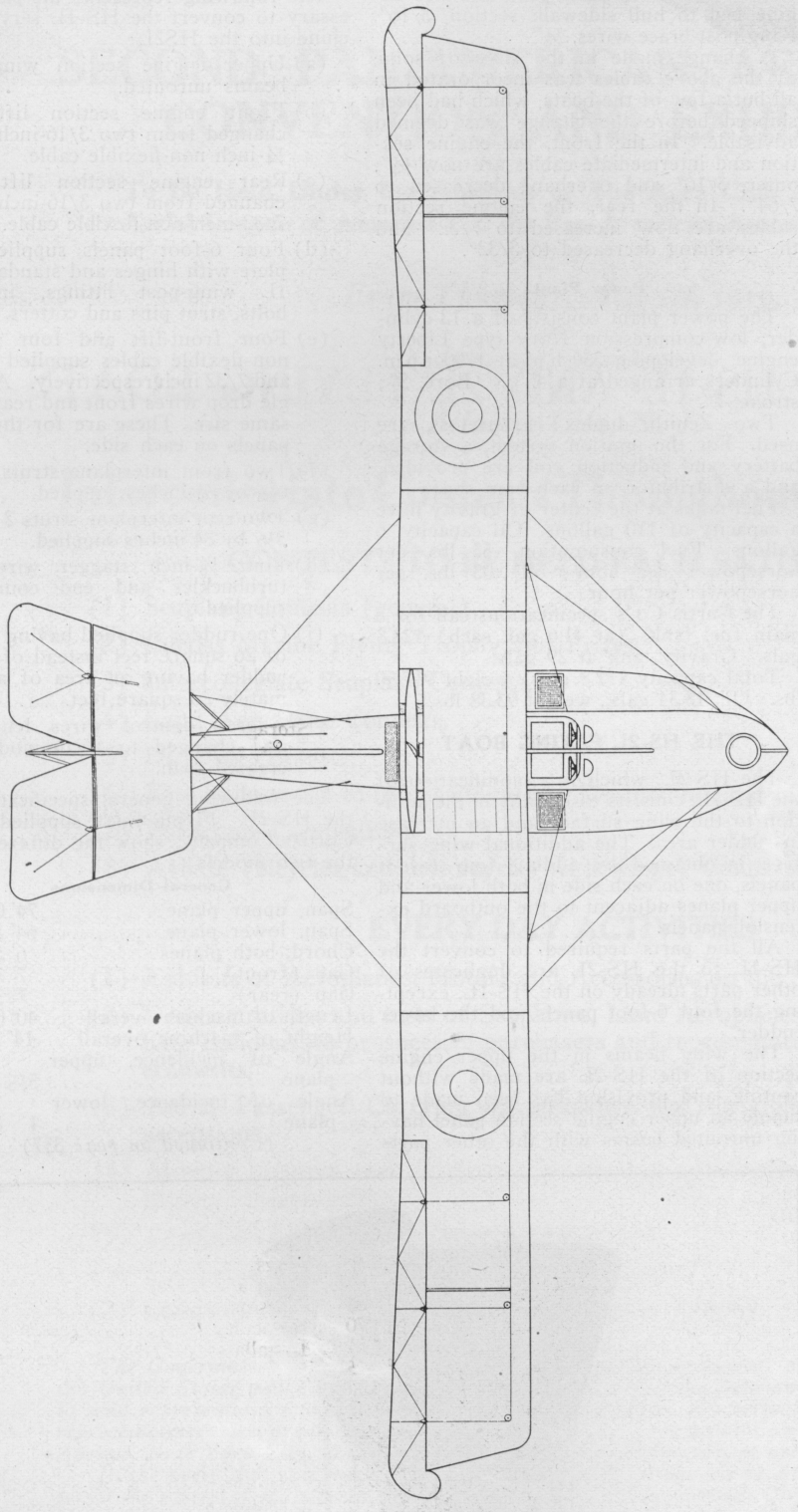
	(*Pounds*)
Medical emergency kit	2
Radio and installation	110
Total	112

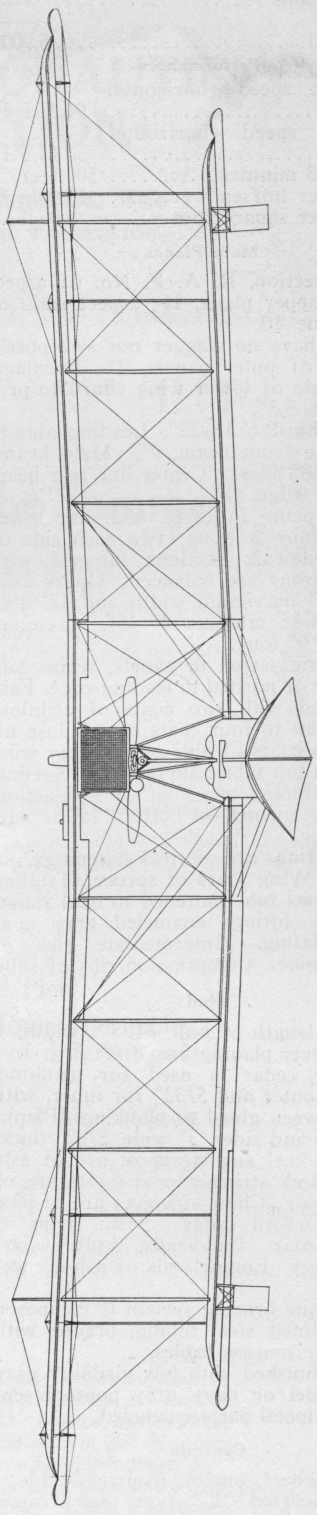
Summary

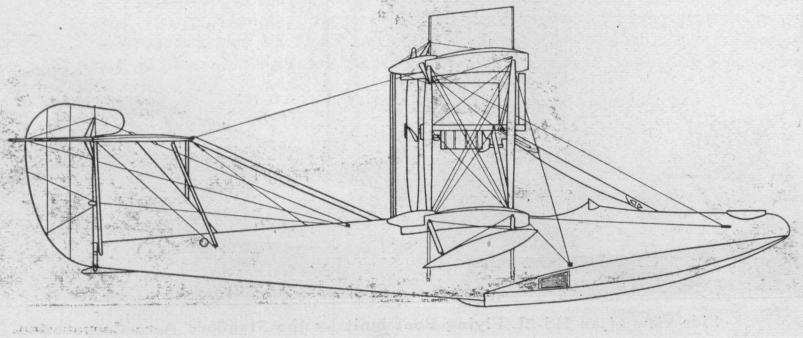
	(*Pounds*)
Hull (including soakage)	1,265
Wings, tail, etc	1,400
Ordnance Equipment	560
Engines and equipment	1,336
Electrical equipment	53
Accessories	52
Navigation equipment	32



One of the Curtiss HS-2L Flying Boats at the Rockaway Point Naval Air Station







NAVY TYPE HS 2L
330 HP LIBERTY
FLYING BOAT

Scale of feet

2 4 6 8 10 12 14

McLaughlin

	(*Pounds*)
Personnel and fuel	1,090
Miscellaneous	112
Total	5,900

Performances

Maximum speed (horizontal flight)	91 M.P.H.
Minimum speed (horizontal flight)	53 M.P.H.
Climb in 3 minutes	500 feet
Weight per horsepower	17.9 lbs.
Weight per square foot	9.03 lbs.

Main Planes

Wing section, R. A. F. No. 6; aspect ratio of upper plane, 11; aspect ratio of lower plane, 10.

Planes have no stagger nor sweepback. Dihedral of outer panels, 2°. Decalage, 1.5°. Angle of lower wing chord to propeller axis, 5.5°.

Wing chord, 6' 3 5/32". Leading edge to center line front beam, 9". Main beams centered 48" apart. Center line rear beam to trailing edge, 18".

Upper plane in three sections; lower plane in four sections (two each side of hull). Sidewalk sections integral with hull. Ailerons are balanced. Upper ailerons 2' 2" maximum width and 17' 8½" long. Lower ailerons 1' 10" maximum width, 12' 9" long.

All fabric sewed to panels, seams laid diagonally or normal to leading edge. Fabric finished with two coats of cellulose acetate; two to four coats of cellulose nitrate; two coats of anti-actinic gray wing enamel on top fabric surfaces and vertical fabric surfaces; one coat of anti-actinic gray wing enamel on bottom fabric surfaces.

Strut fittings are of steel stampings and forgings. Wing spars of spruce. Trailing edge of steel tube flattened to oval shape. Wing-post fittings enameled gray over copper plating. Intermediate ribs of lightened pine. Compression ribs of solid pine.

Hull

Overall length of hull, 34' 5"; width, 4' 0" width over planing fins, 8' 0".

Pine or cedar is used for planking, 3/16" for outer and 5/32" for inner, with fabric between glued to planking. Planking on top and sides, 5" wide, 5/32" thick.

Frames, keel and sternpost are of ash. Keelson, deck stringers and floors are of pine or cedar. Chine stringers are of pine or Port Orford cedar. Seam strips of Spanish cedar. Bulkheads, 3-ply waterproof veneer. Engine beds of ash-spruce-ash.

The engine bracing system is composed of streamlined steel tubing, braced with non-flexible tension cables.

Hull is finished with low visibility gray wing enamel or navy gray pontoon enamel. All metal parts enameled.

Controls

Double wheel control. Control bridge is of the inverted "U" type, ash frame, equipped with two 4-spoke bronze spider, black walnut rim, 16" hand control wheels.

Bronze sheaves for guiding cables. Elevator control lines attached to bridge by steel fittings. Bridge ends reinforced by lightened steel fittings.

Rudder foot-bars of ash, mounted on bronze blocks.

Throttle and spark advance control levers mounted in operator's cockpit located between the two seats on diagonal bridge. Cutout switch located within reach of pilot.

Bracing Cables

All cables galvanized, non-flexible. Front and rear engine section and intermediate cables are 3/16"; outer, 5/32". Flying cables doubled. Stagger cables, single, ⅛". Engine bed to top inner post, and also engine bed to hull sidewalk section, 3/16". King post brace wires, ⅛".

A change made in the sizes of some of the above cables was incorporated in all but a few of the boats, which had been shipped before the change was deemed advisable. In the front, the engine section and intermediate cables are now ¼", outer, 3/16" and overhang decreased to 7/64". In the rear, the engine section cables are now increased to 7/32" and the overhang decreased to 3/32".

Power Plant

The power plant consists of a 12-cylinder, low-compression Navy type Liberty engine, developing 330 h.p. at 1700 r.p.m. Cylinders arranged at a 45° V. Bore, 5"; stroke, 7".

Two Zenith duplex carburetors are used. For the ignition system, a storage battery and induction coil are provided, and a distributor on each cam shaft.

Fuel tanks at the center of gravity have a capacity of 110 gallons. Oil capacity, 6 gallons. Fuel consumption, .55 lbs. per horsepower per hour; oil, .03 lbs. per horsepower per hour.

The Curtis Co.'s specifications call for 3 main fuel tanks (at 41.6 gal. each) 124.8 gals. Gravity tank at 29 gals.

Total capacity 152.8 gals., weight 917.50 lbs. Oil, 13.34 gals., weight 93.38 lbs.

THE HS-2L FLYING BOAT

The HS-2L, which is a modification of the HS-1L, consists essentially in the addition to the wing surface and an increase in rudder area. The additional wing surface is obtained by adding four 6-foot panels, one on each side in both lower and upper planes adjacent to the outboard extension panels.

All the parts required to convert the HS-1L to the HS-2L are duplicates of other parts already on the HS-1L, excepting the four 6-foot panels and the larger rudder.

The wing beams in the upper engine section of the HS-2L are made without routing, and provision has been made to supply an upper engine section panel having unrouted beams with the other parts necessary to convert the HS-1L to the HS-2L.

The following represents the parts necessary to convert the HS-1L service machine into the HS2L:

(a) Upper engine section wing panel beams unrouted.

(b) Front engine section lift wires changed from two 3/16-inch to two ¼-inch non-flexible cable.

(c) Rear engine section lift wires changed from two 3/16-inch to two 7/32-inch non-flexible cable.

(d) Four 6-foot panels supplied complete with hinges and standard HS-1L wing-post fittings, including bolts, strut pins and cotters.

(e) Four front-lift and four rear-lift non-flexible cables supplied ¼ inch and 7/32 inch respectively. Also single drop wires front and rear of the same size. These are for the added panels on each side.

(f) Two front interplane struts 2⅝ by 6⅝ by 84 inches supplied.

(g) Two rear interplane struts 2 3/16 by 5½ by 84 inches supplied.

(h) Four ⅛-inch stagger wires with turnbuckles and end connections supplied.

(i) One rudder supplied having an area of 26 square feet instead of HS-1L rudder having an area of approximately 20 square feet.

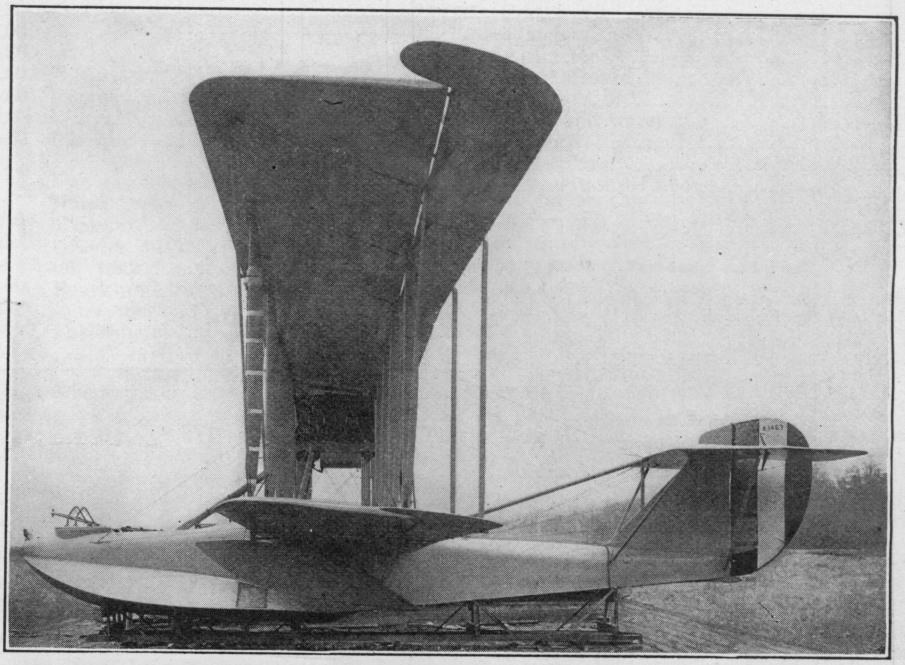
(j) Aileron control wires lengthened and changed to accommodate increased span.

The following general specifications of the HS-2L. Flying Boat, supplied by the Curtiss Company, show the differences in the two models:

General Dimensions

Span, upper plane	74' 0 19/32"
Span, lower plane	64' 1 21/32"
Chord, both planes	6' 3 5/32"
Gap (front)	7' 7 1/8"
Gap (rear)	7' 5 29/32"
Length of machine overall	40' 0"
Height of machine overall	14' 7¼"
Angle of incidence, upper plane	5½ degrees
Angle of incidence, lower plane	4 degrees

(*Continued on page* 357)



Side view of an HS-2L Flying Boat built by the Standard Aero Corporation

SECOND PAN-AMERICAN AERONAUTIC CONVENTION AND EXHIBITION

To Be Held Under the Auspices of The Aero Club of America, The Aerial League of America and the Pan-American Aeronautic Federation.

From Thursday, May 1st, 1919,
to
June 1st, inclusive,
at
Atlantic City, N. J.

Intercollegiate Contests Throughout the Summer

CONTESTS TO BE HELD EACH SATURDAY

(1) Seaplane Contests (general),
(2) Curtiss Marine Flying Trophy and Prizes,
(3) Intercollegiate Seaplane Contests,
(4) Land Aeroplane Contests,
(5) Dirigible Contests,
(6) Kite Balloon Speed in Ascending and Descending, and Maneuvering Contests,
(7) Parachute Competition,
(8) Aviette (bicycles and motorcycles with wings) Contests.

EVERY DAY ACTIVITIES

(1) Exhibits of Aeroplanes, Motors and Accessories on the Steel Pier,
(2) Demonstrations and tests of Seaplanes, Land Aeroplanes, Motors, Dirigibles, Kite Balloons, to prospective purchasers and representatives of different governments,
(3) Aerial Passenger Carrying by seaplanes and dirigibles, and kite balloon ascensions,
(4) Moving pictures and Addresses by leading authorities on most important phases of aeronautics.
(5) Competition for the Pulitzer Trophy.
(6) Competition for the Atlanta Journal Trophy.
(7) Competition for the Curtiss Marine Flying Trophy.

The Governments and Aeronautic, Sporting, Scientific, Industrial and Civic organizations of the United States and all the countries in the world, excepting Germany and her allies, are invited to send representatives to attend this great aeronautic event. On arrival in the United States these representatives should call at the Headquarters of the Convention Committee at No. 297 Madison Avenue, New York City, to register and receive their official badges and the official program.

In the event that it is more convenient for them to go directly to Atlantic City they will register at the offices of the Convention located at the following Atlantic City hotels: Hotel Traymore, Hotel Chalfonte, The Breakers Hotel, Hotel St. Charles, Hotel Marlborough-Blenheim, Hotel Chelsea, Hotel Alamac, Hotel Dennis and Hotel Haddon Hall.

Representatives of the Convention Committee will be at the Bureaus of the Aeronautic Convention at the above-named hotels and will issue the official badges which admit the bearer to the Aeronautic Hall, as well as the Aero Exhibition on the Steel Pier, the judges' enclosure during contests, and to the Aerodrome and seaplane stations where the aircraft and motors will be demonstrated.

All communications until May 1st should be addressed to Rear Admiral Peary, Chairman, Aeronautic Convention, Aero Club of America, 297 Madison Avenue, New York City.

Entries for the contests should be addressed to the Contest Committee, Aero Club of America, 297 Madison Avenue, New York City.

DAILY PROGRAM FOR PAN-AMERICAN AERONAUTIC CONVENTION, EXHIBITION AND CONTESTS.

THURSDAY, MAY 1ST

Opening of Convention and Exhibit.

AFTERNOON—Reception at Aeronautic Hall on the Steel Pier. Addresses by United States Government State and aeronautic authorities.

EVENING—Aero Show and addresses by officials.

FRIDAY, MAY 2ND

AFTERNOON—Aero Show. Preliminary tests of seaplanes, dirigibles and kite balloons.

EVENING—Moving pictures and address on flying for sport and pleasure.

SATURDAY, MAY 3RD

AFTERNOON—Seaplane and dirigible races, and kite balloon ascending and descending contest.

EVENING—Ball.

SUNDAY, MAY 4TH

MORNING—Memorial service by eminent Divine for the dead airmen.

AFTERNOON AND EVENING—Reception to allied aces and heroes of the air and their parents, and announcement of the award of the Aero Club of America Medal of Valor, and the Aerial League of America Diploma of Honor.

MONDAY, MAY 5TH

AFTERNOON—First parachute contest for $500 Bennett Prize.

EVENING—"The Large Dirigible and Its Value for Transportation." Representatives of railroads, express, steamship and other transportation organizations invited to attend.

TUESDAY, MAY 6TH

AFTERNOON—Illustrated addresses on "Aerial Forest Patrol." Forestry Department of every State invited.

EVENING—"Work of Aerial Police Squadrons, and Why Every City Should Have One."

WEDNESDAY, MAY 7TH

AFTERNOON AND EVENING—Aerial Mail Day. Illustrated address on, and consideration of, "Aerial Mail Planes." Chairman of Post Office and Post Roads Committees of House of Representatives and Senate, and Postmaster General Burleson invited to deliver addresses. (26,000 United States Postmasters, and Chambers of Commerce of 13,000 cities invited to attend.)

THURSDAY, MAY 8TH

AFTERNOON AND EVENING—Illustrated addresses on the "Need of Municipal Aerodromes, and the Part to be Played by Aircraft in City Planning." Chambers of Commerce and City Planning Commissions of 13,000 cities invited to attend.

FRIDAY, MAY 9TH

AFTERNOON—Arrival of seaplanes and army planes from Army and Navy Air Stations. Second parachute competition for the $500 Bennett Prize.

EVENING—Illustrated addresses on "Latest Developments in Aerial Warfare and Adventures in Aerial Warfare," told by famous aces.

SATURDAY, MAY 10TH

AFTERNOON—Army, Navy and Marine Corps Day. Aerial contests and tournament.

EVENING—United States Army and Navy Officers' Reception. Reception and addresses at Aeronautic Exhibition Hall on the Steel Pier.

SUNDAY, MAY 11TH

AFTERNOON AND EVENING—Presentation of the flags by each State of the United States to the Aero Squadrons representing the States. Each State will present a flag to each Aero Squadron, the members of which were overwhelmingly natives of that State. The presentation will be made by representatives from the State and the Aero Club and Aerial League branch of that State. All States and cities invited to send delegates, and Army, Navy and Marine Corps to send representatives.

MONDAY, MAY 12TH

AFTERNOON—Demonstrations and illustrated addresses on the "Value of Aircraft for Advertising by Day and by Night." All national advertisers and advertising agents invited to attend.

EVENING—"Pan-American Aerial Transport Over Land." Addresses by members of the commissions of the 20 Latin-American Republics.

TUESDAY, MAY 13TH

AFTERNOON AND EVENING—"Pan-American Aerial Transport Over Water." Addresses by members of the 20 Latin-American Republics' Commissions.

WEDNESDAY AND THURSDAY, MAY 14TH AND 15TH

AFTERNOONS AND EVENINGS—"The Airways and Aerial Transport in Europe, Canada, Africa, Australia and Asia."

FRIDAY, MAY 16TH

AFTERNOON AND EVENING—"Aerial Navigation Instruments for Flying Over Land and Water." Aviators, navigators, scientific instrument makers and aeronautic experts invited.

SATURDAY, MAY 17TH

AFTERNOON—Aerial races and contests. Illustrated addresses on Aerial Photography.

EVENING—Extensive exhibit of aerial photographs and photographic apparatus. All photographers, professional and amateur, and makers of photographic apparatus invited.

SUNDAY, MAY 18TH

AFTERNOON AND EVENING—Illustrated addresses on "Aerial Exploration and the Use of Aircraft for Coast and Geodetic Survey."

MONDAY, MAY 19TH

AFTERNOON—Addresses on "Need of Broader Attitude Regarding Insurance for Aircraft and Aviators."

EVENING—Illustrated address on "How Army Medical Standards and Inspection Lessen Accidents." Insurance companies and agents invited.

TUESDAY, MAY 20TH

AFTERNOON AND EVENING—Illustrated addresses showing different ways of crossing Atlantic by air and the problems to be solved to accomplish same successfully.

WEDNESDAY, MAY 21ST

AFTERNOON—Aero Safety Day. Discussion of aero safety provisions made; improvements in aeroplane construction; increased reliability of aero motors; devices which make for safety in flying.

EVENING—"Progress Made in the Art of Piloting Aeroplanes." Illustrated.

THURSDAY, MAY 22nd

AFTERNOON AND EVENING—Addresses and discussions of meteorology—"How the Weather Forecasts Can be Extended and Made More Efficient by the Use of Aircraft in Exploring the Upper Air," also "How the Weather Forecasts Help Aerial Navigation," and "Telegraphic and Climatic Factors in Relation to Aeronautics.

FRIDAY, MAY 23RD

AFTERNOON AND EVENING—Addresses on "Aerial Jurisprudence—Aerial Laws and Regulation of Air Traffic." (First day.) Lawyers, traffic commissioners and police authorities of different countries invited.

SATURDAY, MAY 24TH

AFTERNOON—Races and contests.

EVENING—Illustrated address on "Need of Establishing Altitude Levels for International, Interstate and Interurban Air Travel."

SUNDAY, MAY 25TH

AFTERNOON AND EVENING—Aeronautic Art Day. Address on "Aerial Painting and Sculpture of Different Countries, and Exhibition of Aerial Paintings," by Lieut. Farre, Lieut. Ruttan and others. All prominent artists, managers of art galleries and art patrons invited to attend.

ENGINEERING WEEK.

MONDAY, MAY 26TH

AFTERNOON—"Aeronautic Engineering Problems and Their Prospective Solution."

EVENING—Opening of contests for designs and ideas for large aeroplanes.

TUESDAY, MAY 27TH

AFTERNOON—"Factors That Increase the Efficiency for Large Dirigibles."

EVENING—"Advantages of Veneer and Plywood for Aircraft Construction."

WEDNESDAY, MAY 28TH

AFTERNOON—Address on "Problems of Flying at 35,000 Feet and Over, and Their Prospective Solution."

EVENING—"Present Day Aero Engines."

THURSDAY, MAY 29TH

AFTERNOON—"Flying Boats Versus Hydroaeroplanes for Sport and Transportation."

EVENING—Contest for designs and ideas for large aeroplanes.

FRIDAY, MAY 30TH (Memorial Day)

AFTERNOON—Dirigible races, kite balloon speed ascending contest; parachute contest.

EVENING—Reception at the Aeronautic Hall, Steel Pier.

SATURDAY, MAY 31ST

AFTERNOON—Seaplanes, land planes and dirigible contests. Aviette competition at which all cyclists and makers of bicycles and motorcycles will be invited.

EVENING—"International Medical Standards for Aviators in War and Peace." Reports from different countries illustrated with attractive films. 50,000 medical men invited.

SUNDAY, JUNE 1ST

AFTERNOON AND EVENING—Award of prizes and diplomas for all events.

AEROPLANE PROPELLER WASTAGE REDUCED

By ROLF THELEN

of the Forest Products Laboratory, United States Department of Agriculture

THROUGHOUT the war the development of the best practice in propeller manufacture, which is a highly specialized art requiring a thorough knowledge of wood technology and wood gluing as well as the greatest degree of skill in woodworking and gluing, has been the goal of constant co-operative effort by the Forest Products Laboratory of the Forest Service and the War and Navy Departments. As a result of this joint work, methods have been perfected which insure the production of the highest type of propeller, with the minimum wastage due to rejection on account of poor manufacture or improper handling before, during, or after manufacture. These methods have been adopted in the manufacture of American training and combat propellers, and have contributed their share to the well-known excellence of these propellers. In this connection it is interesting to note that, in the case of the Allies, it is reported that 80 per cent of the propellers received at the front were rejected on account of improper methods in handling and manufacture.

The regular researches of the Forest Products Laboratory on wood technology have been under way for many years. Its activities in connection with propeller investigations, which are in addition to these, may be grouped under four general heads, as follows: (1) Drying and storing of propeller stock; (2) Selection of laminations with proper regard for direction of grain, and density and moisture condition; (3) Glues and gluing; (4) Protection and storage of finished propellers.

Propeller lumber, as it comes from the sawmill, is usually 1 inch thick, 6 inches or more wide, and 8 feet or more long. This lumber is green when cut, and must be seasoned before it can be used in propeller manufacture.

While it is quite possible to air-season propeller lumber satisfactorily, the time required is excessive when war is in progress and speed is essential. Hence it became necessary to develop a method of artificial seasoning which would not injure the properties of the wood. The Forest Products Laboratory, which already possesed a great deal of experience in kiln-drying wood, attacked the specific problem of the proper artificial drying of propeller woods, and developed a method whereby the stock could be perfectly dried in a week or two. This method was adopted as standard by both Army and Navy and used for all propeller stock with the exception of certain relatively small amounts which had been cut before the declaration of war and which were available in the air-seasoned conditon. The Laboratory had already developed a dry-kiln in which this method of drying could be carried out, and a number of batteries of kilns of this type were built for drying aircraft lumber. Among these is the battery at Vancouver, Wash., one of the largest batteries of dry-kilns in the world. This battery was erected especially for drying spruce and Douglas fir aeroplane stock.

In developing this process, many experimental drying runs were made upon the various woods used for propellers, and the properties of the kiln-dried material were compared with those of similar material carefully air-dried. This comparison was reached through the medium of many thousand strength tests made both upon the kiln-dried material and upon that which had been air-dried. As a check, strength tests were also made upon green material. The conslusion drawn from this work is that properly kiln-dried material is appreciably better than the best air-dried stock. This had been forecast by the Laboratory's engineers, who based their judgment upon the fundamental principles involved.

After the stock has been dried, it must be stored under proper conditions of atmospheric temperature and humidity, in order that final adjustment of the moisture in the wood may take place, and that it may contain just the right degree of moisture when it is finally made up into propellers. This degree of moisture depends upon the atmospheric conditions of the locality where the propellers are to be used. Thus, training propellers for the southern fields required drier wood than was needed for battle propellers to be used on the battle lines in France. The Laboratory conducted researches to determine the relation between atmospheric conditions and the amount of moisture contained in the wood when exposed to these conditions, and it furnished the data upon which are based the specifications for atmospheric temperature and humidity in propeller factories and store-rooms.

Propellers are almost sure to swell and shrink during storage and use unless they are manufactured with the greatest possible care and specially treated to prevent changes in moisture when changes in atmospheric conditions take place. The problem of reducing this swelling and shrinking to a minimum and of leaving the remainder as uniform as possible received the most serious attention of the Laboratory. It was determined that the amount and character of swelling and shrinking was, in general, due to three factors, namely, grain, density, and moisture. The shrinkage and swelling of wood with changing moisture content is not uniform in all directions. The shrinkage lengthwise is practically negligible, while that measured in a direction corresponding to the circumference of the tree is about 1½ times that measured in a direction corresponding to the diameter of the tree. Shrinkage depends also upon the weight or density of the specimen, dense pieces having a greater shrinkage than light ones.

Shrinkage or swelling, when the wood changes from one moisture condition to another, varies with the amount of the change—the greater the change in moisture, the greater the change in the volume of the piece. Bearing these three points in mind, it is evident that, to obviate trouble from shrinkage and swelling in the finished propellers, all the laminations should be as nearly alike as possible in direction of grain (on the end faces), density, and moisture content. Further, proportion of the moisture should correspond, as nearly as possible, to that of the atmosphere in the locality where the propeller is to be used. These facts have all been taken advantage of in the manufacture of American propellers, and their application has done much to enable us to reach the present high standard in propeller construction.

All modern propellers, with one or two minor exceptions, are made by gluing together a number of boards or laminations which are usually from ½ to ⅞ of an inch thick. From five to nine laminations are ordinarily used in each propeller. In order to secure satisfactory service, it is essential that only the best grades of glue be used. When the United States entered the war, none of the government agencies had had enough experience with glues for a proper glue specification to be prepared or the necessary inspection work to be carried out. The Forest Products Laboratory immediately started the necessary investigations, and drafted a satisfactory propeller-glue specification under which practically all propeller glues for the Army and Navy have been purchased. It also developed methods of making tests and instructed Army inspectors in the proper inspection of glues. The great bulk of glue used in manufacturing propellers was inspected and certified by Army inspectors stationed at the Laboratory.

As has already been pointed out, propellers exposed to varying atmospheric conditions, even when varnished, will absorb or give off moisture, swelling or shrinking in the process. Unless the propellers are made with the greatest possible skill and care, the shrinking and swelling are apt to produce injurious warping and set up stresses which may cause the propeller to fail in service. The need for a coating practically impervious to the transmission of moisture was evident, and the Laboratory conducted several long series of experiments upon many types of coatings, including various shellacs, varnishes, enamels, electroplated metal coverings, vulcanite, and several kinds of metal-leaf coatings. A coating was finally devised, which was many times more effective than varnish coatings in preventing moisture transmission, and this coating has been approved for use by the Army. This coating consists of a layer of very thin aluminum leaf laid on over a layer of partially dry varnish, and then protected with several layers of enamel and varnish. While the coating has no greater resistance to wear than that offered by the varnish and enamel coats over the leaf, it does insure perfect protection to the propeller during storage and shipment, and in service until sand or spray wears it off. Since the greater portion of the existence of the average propeller is passed either in storage or shipment, the usefulness of the coating is apparent.

There are many phases of propeller manufacture which warrant further investigation, and the Laboratory now has under way a comprehensive study of propeller construction. As part of this research, several hundred propellers of various species have been made up under varying circumstances. These are being stored under controlled conditions of temperature and humidity in order that a study may be made of the exact effect of the manufacturing conditions upon the value of the finished propeller.

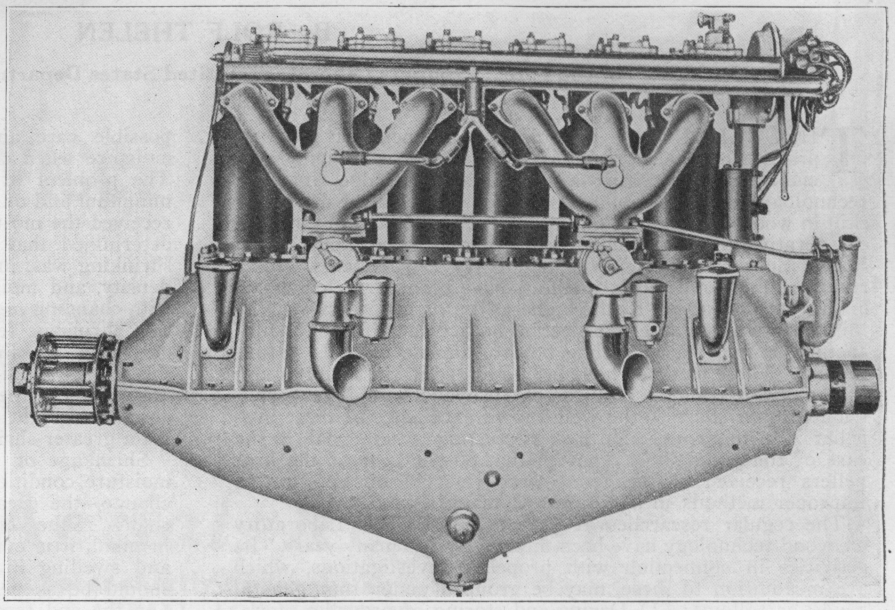
HALL-SCOTT TYPE L-6a AERO ENGINE

IN view of the rapid advances and improvements made in aircraft and power plant designs, the Hall-Scott Company, in keeping with recent development and progress have designed and perfected a new six-cylinder engine, which not only embodies all the superior qualities of the A-5 and A-5a Types, but also contain new and superior features.

The L-6a engine conforms in general appearance and design to the A-5 engine, as well as in general dimensions.

The general characteristics are as follows:

Number of Cylinders.....6
Bore 5-inch
Stroke 7-inch
Rated H.P. 200
Speed 1700
Propeller Dia.....9 feet
Pitch .....6 feet
Carburetor .....Miller
Normal B.H.P.....215
Method of Cooling—Water—Centrifugal Pump.
Ignition .....Delco
Piston Displacement—824.670 cu. in. 137.445 cu. in. per cylinder)
Piston Speed at Normal R.P.M. (1700)—1983 feet per minute
Compression Volume.....24.74 cu. in.
Compression Ratio.....6.555
Weight of Engine dry, including Carburetor and Ignition System—495 pounds
Weight dry, per Normal B.H.P.—2.30 pounds
Weight Temperature Inlet—150 degrees Fehrenheit
Water Temperature Outlet—165 degrees Fehrenheit
Water Circulation.18.5 gallons per minute



The Hall-Scott Type L-6a Aero Engine

The L-6a engine is of the vertical type with overhead cam shaft.

The cylinders are machined from steel forgings with steel jackets welded on similar to those used on the Liberty 12 engine.

The cooling system is of the circulating pump design and is very simple and efficient. Welded steel manifolds are used exclusively, obviating the necessity of any flexible pipes or tubing which is more or less liable to breakage. The connections are made with specially constructed rubber hose connections held on with clamps, permitting the easy removal of parts.

The connecting rods are of the I beam or H section, similar to all Hall-Scott rods, except that at the crank pin end the cap is bolted on with four bolts, instead of two, as heretofore used.

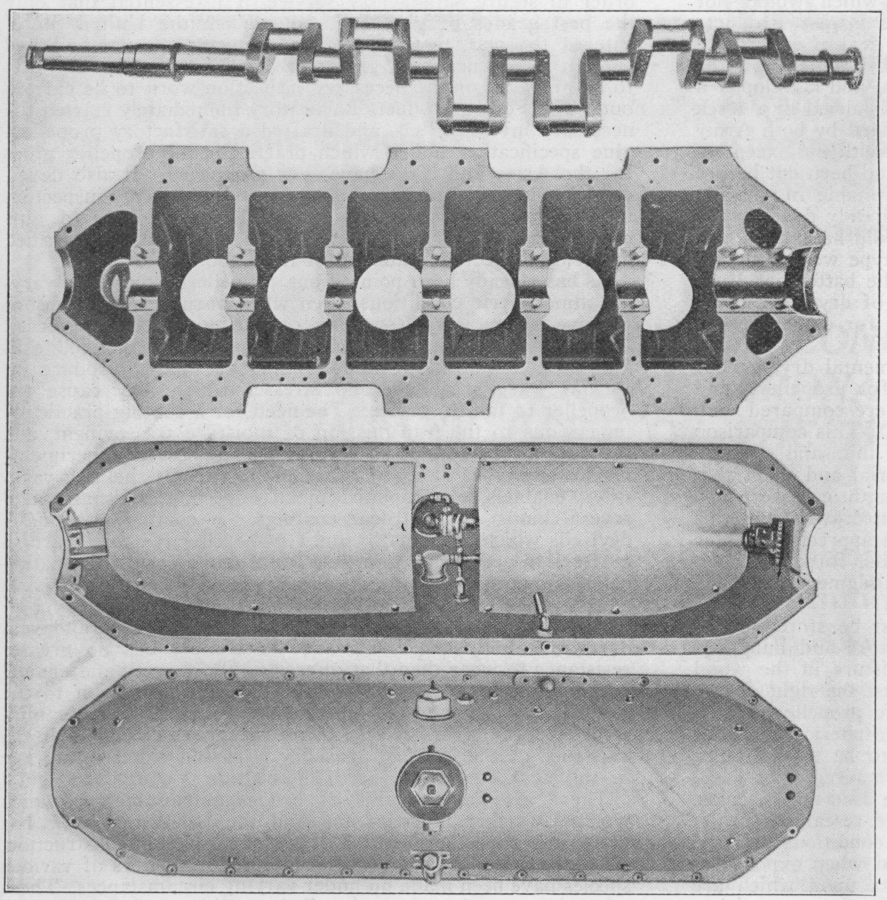
The crank shaft is the same as the A-5a type, with the exception of the cheeks, which are designed to withstand the extra stresses, resulting from a higher powered engine.

The propeller end of shaft is designed so the crank shaft flange can be removed with the propeller, permitting a quick installation of a new propeller if necessary. The crank is of the seven-bearing type with ball-thrust bearings at the propeller end.

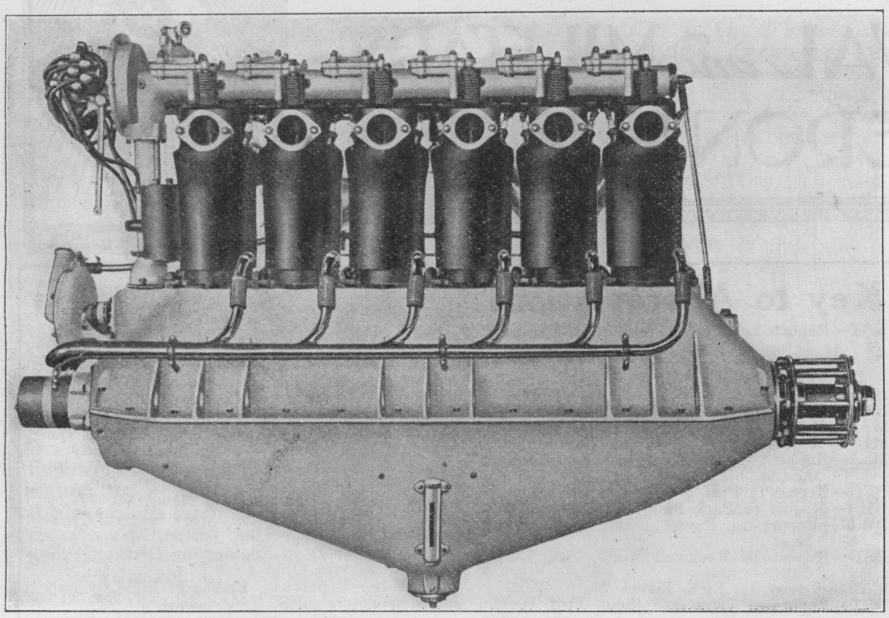
The cam shaft is of the one-piece type, cams and flange being integral, machined from a drop forging. The cam shaft is contained in an oil-proof housing, mounted on the cylinders, and is driven through bevel gears on a vertical shaft. The cam shaft and vertical shaft and all working parts are oiled under pressure from main bearing in the crank case. Surplus oil is returned to oil sump through the vertical shaft housing.

The crank cases are of aluminum. The lower case or oil sump can be removed without breaking any pipe connections. In the lower case are located the oil strainer and dirt trap oilsight gauge and a twin oil pump; one pump circulates oil through the engine from oil held in the sump, the other acting as a supply pump to oil sump, pumping oil into it from an external oil tank in a regulated quantity.

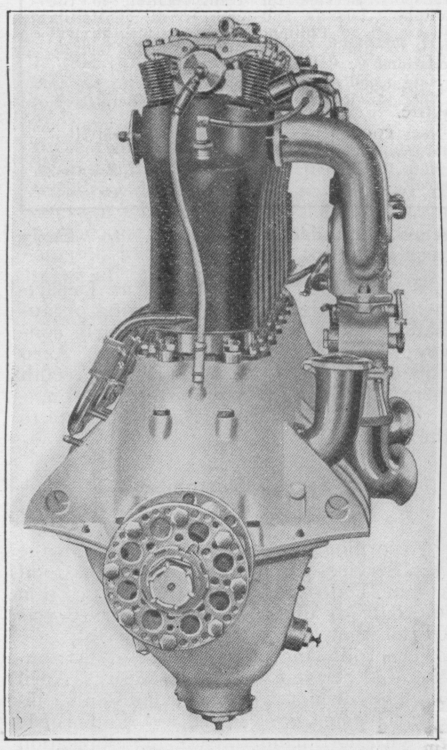
In the lower oil sump is a very sensitive and rugged oil relief valve, which can be adjusted externally so the oil pressure can be regulated to any pressure



Crankshaft; upper crank case, illustrating the seven main bearings with bolts; inside view of lower crank case, showing splash pan, oil pump, strainer and pressure relief valve; and outside view of lower crank case



Exhaust side Type L-6a Hall-Scott Aero Engine



Propeller end, Hall-Scott Engine

from zero to thirty-five pounds. Splash plates are also put in the lower case to prevent excessive splash from the dipper action of the connecting rods and crank.

Carburetion is secured through two specially designed carburetors and twin manifolds, which are of the hot-spot water-jacketed design. The carburetors are inter-connected through the controls.

The ignition is secured through a specially designed Delco Unit. The twin distributors are mounted on the end of the cam shaft housing and driven off the cam shaft. The coils are mounted directly underneath the distributors on the vertical shaft housing. The generator is driven off the end of the crank shaft and is bolted to the crank cases.

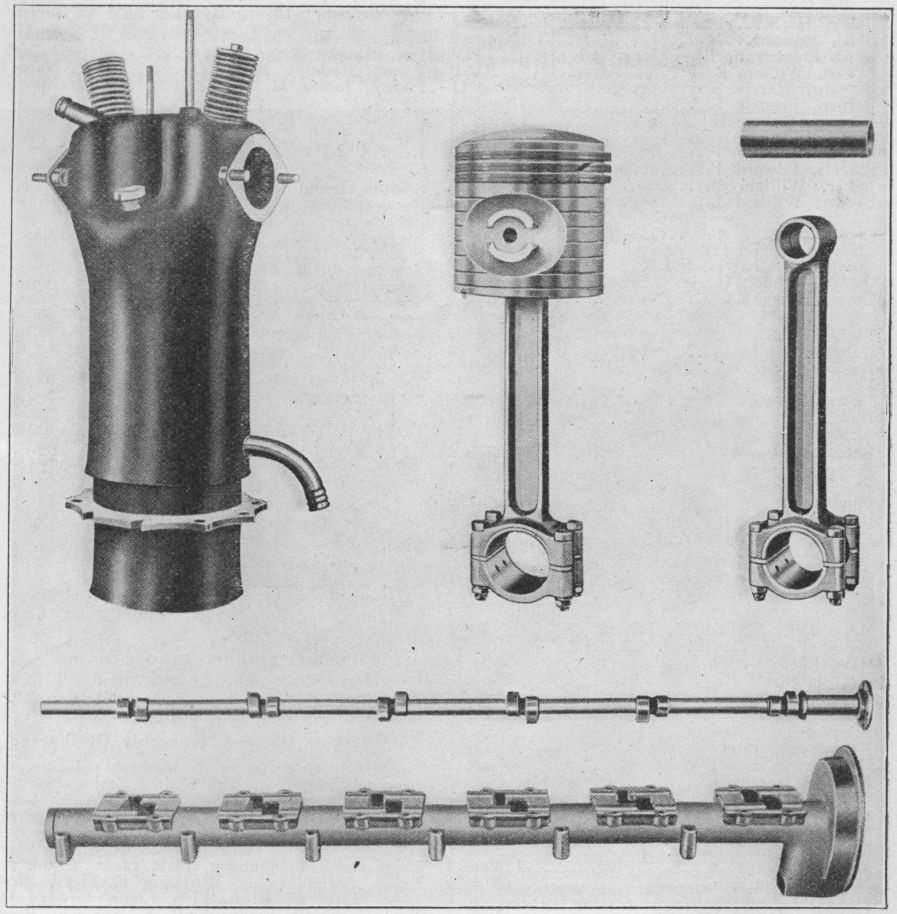
The oiling system is of the force feed or pressure type, oil being pumped to main bearings from which it is conducted through annular and radial drilled holes in crank shaft to connecting rod bearings.

The upper end of connecting rod and the pistons are oiled from splash and crank case fog. Large oil fillers are located on the intake side of the crank case, which also act as breathers.

The main bearing caps are bedded into the upper crank case and are bolted through the case by through bolts, which on the upper end act as cylinder hold-down bolts. Bronze-backed bushings are used in both the case and caps, shims being eliminated entirely with the exception of a few thousandths which permit the bedding of the crank shaft.

The valves are extremely large and located in the cylinder head, actuated through a rocker arm and tappet action. Double coil springs are used on both the intake and exhaust valves for the return action.

The pistons are of the design perfected by the Hall-Scott Company, and are of aluminum alloy, extremely simple in design and remarkably efficient. No clamping devices or set screws are used to hold the piston pin, which is permitted to float in both the rod and pistons.



Assembly of details of the Hall-Scott Type L-6a engine

Increasing Climbing Rate By Greater Friction on Lower Side of Fabric

Writing in the Zeitschrift für Flugtechnik und Motor-Luftschiffahrt, H. von Burberg states that when the wings of an aeroplane are being covered the fabric on the lower surface is sprinkled lightly with sand. Although the friction is thereby increased, the climbing power is considerably improved. This result is associated with the production of innumerable small eddies all in close proximity to each other on the undersurface of the wing, forming a species of air cushion. A fact closely associated with this is the phenomenon that when a machine flies directly into a head wind it climbs better than when flying in still air with the same relative speed. The author considers that this effect is directly connected with the eddying air encountered by the machine.

Experiments are being conducted to test the effects of roughening different parts of the surface of propellers and streamline bodies, and these have so far given satisfactory results. They have shown that roughening the under-surface of the wing is favorable to the production of a cushion of supporting eddies.

NAVAL and MILITARY AERONAUTICS

Key to Abbreviations

ABC—Report to Army Balloon School, Arcadia, Cal.
AGC—Report to Aviation Supply Depot, Garden City, L. I., N. Y.
AMV—Report to Aviation General Supply Depot, Morrison, Va.
ARV—Report to Aviation Supply Depot, Richmond, Va.
BFT—Report to Barron Field, Fort Worth, Tex.
CAF—Report to Carlstrom Field, Arcadia, Fla.
CFT—Report to Carruthers Field, Fort Worth, Texas.
CGC—Report to Aviation Concentration Camp, Garden City, L. I., N. Y.
CJS—Report to Camp Jackson, Columbia, S. C.
CJW—Report to Camp John Wise, San Antonia, Texas.
CRI—Report to Chanute Field, Rantoul, Ill.
CWT—Report to Call Field, Wichita Falls, Tex.
DAP—Report to Director of Aircraft Production, Washington, D. C.
DIS—Honorably discharged from service.
DMA—Report to Director of Military Aeronautics, Washington, D. C.
EOT—Report to Ellington Field, Olcott, Texas.
FOB—Report to Fort Omaha Balloon School, Omaha, Neb.
FSO—Report to Fort Sill School for Aerial Observers, Fort Sill, Okla.
GLC—Report to Gerstner Field, Lake Charles, La.
HHM—Report to Hazelhurst Field, Mineola, L. I., N. Y.
KST—Report to Kelly Field, San Antonio, Tex. (When specified in the order, the number of the field is given in parentheses.)
LDT—Report to Love Field, Dallas, Tex.
LHV—Report to Langley Field, Hampton, Va.
MAC—Report to March Field, Allesandro, Cal.
MDO—Report to McCook Field, Dayton, Ohio.
MIA—Report to U. S. Naval Air Station, Miami, Fla.
PFO—Report to Post Field, Fort Sill, Okla.
PMT—Report to Park Field, Millington, Tenn.
PWM—Report to Payne Field, West Point, Miss.
RSD—Report to Rockwell Field, San Diego, Cal.
RWT—Report to Rich Field, Waco, Tex.
TFT—Report to Taliaferro Field, Fort Worth, Tex. (When specified in the order, the number of the field is given in parentheses.)
TMA—Report to Taylor Field, Montgomery, Ala.
UTA—Report to School of Military Aeronautics, University of Texas, Austin Tex.
WDM—Wire Director of Military Aeronautics upon arrival.
WFO—Report to Wilbur Wright Field, Fairfield, Ohio.

NOTES

Note 1—Report to places mentioned in the order named.

Note 2—Report to Hoboken, N. J., to commanding general, port of embarkation.

Note 3—Report to Director of Air Service, Washington, D. C.

Note 4—Report to Cooperstown, N. Y., to United States Army Hospital.

Note 5—Report to Camp Grant, Ill., to the commanding general for assignment to duty.

Note 6—Report to Fort Porter, N. Y., to commanding officer for assignment to duty.

Note 7—Report to Newport News, Va.

Note 8—Report to U. S. Army General Hospital No. 10, Parker Hill, Boston, Mass.

Note 9—Report to Engineering Division, Air Service, Dayton, Ohio.

Note 10—Report to Emerson Field, Camp Jackson, Columbia, S. C.

Note 11—Report to Camp Bragg, Pope Field, Fayetteville, N. C.

Note 12—Report to San Francisco, California, to General Superintendent of Army Transport Service for transportation to the Philippine Islands, and upon arrival at Manila will report to Philippine Department—he will apply to Chief of Transportation for accommodations.

Note 13—Report to Middletown, Pa.

Note 14—Report to U. S. Army General Hospital No. 8, Otisville, N. Y.

Note 15—Report to U. S. Army General Hospital No. 9, Lakewood, N. J.

Note 16—Report to 1550 Woodward Avenue, Detroit, Mich.

Special Orders Nos. 82-88 Inclusive

A
Akins, Charles....Note 7
Adams, James E....Note 3
Adams, Benjamin H....Note 4

B
Baker, H. S....Note 7
Blair, Edward....Note 2
Byrd, Emmett Earl....LHV
Brown, William C. F....DAP
Bigelow, Harris S....Note 11
Bergen, Francis L....Note 14
Burgess, George H....Note 3
Brode, Clifton A....Note 13
Butler, Thomas P....Note 9
Bartels, Edward F....Note 9
Baker, William D....Note 6
Brown, William L....Note 5

C
Cook, Roy E....Note 9
Christensen, Jens T....Note 7
Cummings, Charles M....Note 7
Catlett, Landen C., Jr....Note 7
Cross, Harry E....Note 9

D
Dight, F. B....Note 7
Doherty, James F....Note 12
Doyle, Horace M....WFO
Dorland, Chester P....PFO
Doust, Horace Tyner....CAF
Dickens, George R....Note 7

E
Ehlers, George W....Note 7
Eding, Gerrard J....Note 3

F
Folker, Arnold F....Note 7
Forsyth, Ralph E....Note 7
Fluegel, Herman....LDT

G
Gilbert, Arthur C....Note 7
Gibson, Norman W....Note 10

H
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Heitz, F. F....Note 7
Hendricks, Adolph....Note 2
Harrington, H. G....Note 7
Hogan, W. C....Note 2

K
Kingsbury, Orrin D....Note 3
Kampmann, John V....Note 5
Kellegrew, Edward W....Note 2
Kirkham, James E....Note 7

M
MacIntyre, Duncan L....Note 8
Mayer, Dudley B....Note 4
Mohr, James H....Note 7
Meyler, George A....Note 7
MacLeod, Norman L....Note 9
McCarty, Eugene R....Note 9
Merritt, Harold D....Note 2
Morrow, Joseph C....Note 4
Moore, Ralph J....Note 3
McLaurin, King H....Note 9
McPherson, A. J....Note 2
Markle, Alvan, Jr....Note 9

N
Neely, J. A....Note 7

P
Pyatt, K. R....Note 7
Pye, Harvey N....EOT
Propst, Rudolph W....Note 3
Piercy, James M....Note 6

R
Rorick, Estell H....Note 2
Rogers, J. B....Note 7
Reid, Charles A....Note 16

S
Stinson, David R....LHV
Sundeen, Martin A....Note 7
Schauweker, A. A....Note 7
Stone, V. D....Note 7
Scoby, R. B....Note 7
Scott, William, Jr....Note 7
Stewart, Guy....Note 2
Snedisor, Howard T....Note 2
Sprague, Clare W....Note 2
Shangraw, Clayton C....Note 3
Selff, Robert E....LHV

T
Tyree, John W....Note 7
Tubb, Talmadge B....Note 2

U
Ulrich, C. W....Note 7

W
Wood, Roland G....Note 6
Wilds, William....Note 5

Y
Yates, F. R....Note 7

Latest Naval Orders

Lieutenant (junior grade) Norman J. Learned, to duty naval air station, Cape May, N. J.

Lieutenant (junior grade) Homer R. Geedes to duty naval aviation detachment, Akron, Ohio.

Air Service Officers Honorably Discharged

The following officers are honorably discharged from the Service of the United States: Second Lieut. Howard W. Heintz, Captain A. S. Leon Richardson, First Lieut. George Perkins, First Lieut. William H. Vollmer, First Lieut Charles H. Shook, Second Lieut. Clarence A. Smith, First Lieut David S. Johnson, First Lieut. Frank A. Pence, Second Lieut. Benjamin F. Fiery, First Lieut. Elias H. Kron, First Lieut. Edward D. Babcock, First Lieut. Emil F. Schwab, First Lieut. Percy H. Willis.

Aero Squadrons Assigned to Early Convoy

Washington, D. C.—The War Department announces that the following organizations have been assigned to early convoy: 50th Aero Squadron; 637th Aero Squadron; 650th Aero Squadron; 660th Aero Squadron; 1108th Aero Squadron.

The 351st Aero Squadron is en route to the United States.

Air Service Demobilization

Progress in Demobilization

According to reports received from the Air Service, the net decrease in the total commissioned and enlisted strength from the date of the armistice to April 3 was 69 per cent.

The following table shows the distribution and per cent of net decrease to April 3. The strength figures include only officers and men not yet ordered discharged; they do not include men at demobilization camps awaiting discharge.

	Nov. 11	*April 3*	*Per cent net decrease*
Cadets	5,775	763	87
Officers	20,586	3,237	84
Enlisted men	164,266	55,550	66
Total	190,627	59,550	69

Demobilization of Air Service Personnel Overseas

During the week ending April 3, 1919, the Air Service personnel overseas decreased 193 men as against a weekly average of 2,780 during the seven preceding weeks. The strength of the Air Service in the United and overseas is shown for various dates in the following table:

	U. S.	*Overseas*
Nov. 11	111,846	78,786
Dec. 2	115,216	78,061
Dec. 26	99,010	59,917
Jan. 30	46,919	57,527
Feb. 27	33,649	53,087
Mar. 28	25,347	41,800
April 3	17,943	41,607

Colonel Kenly Honored By King George

Washington, D. C.—Colonel William L. Kenly, until recently Director of Military Aeronautics, has been conferred the honor of Companion of the Order of the Bath by King George of England. This tribute is the result of Colonel Kenly's brilliant work as Director of Military Aeronautics and, prior to that, as officer in charge of all flying at the battlefront. Colonel Kenly was recently reduced to his present rank in connection with the demobilization of the Army and has not so far been awarded any decorations from the American Government.

Army Expenditures Reducing

Washington, D. C.—According to an official statement prepared by the Statistics Branch of the General Staff, March is the first month to show a decided decrease in Army expenditures, with 58 per cent of the previous monthly average. In comparison, February expenditures were 96 per cent of the average.

The Bureau of Aircraft Production withdrew $11,082,000 from the Treasury during March, and the Department of Military Aeronautics drew $2,518,000. These two combined form 4 per cent of the War Department's total March expenditures.

The average withdrawals between July 1, 1918, and January 31, 1919, were $18,000,000 and $5,230,000 for the Bureau of Aircraft Production and Department of Military Aeronautics, respectively, and these two formed 9 per cent of the total War Department expenses. The March withdrawals formed 62 per cent of the average withdrawals for the eight month period for the Bureau of Aircraft Production and 48 per cent for the Department of Military Aeronautics.

Congressional Medal of Honor Awarded to Frank Luke

The Congressional Medal of Honor, America's highest award for valor, has just been awarded to Lieut. Frank Luke, Jr., Air Service, of Phœnix, Arizona, America's second ace, who was killed in action September 29, 1918, after bringing down two enemy planes, three balloons and about a dozen German soldiers.

Frank Luke, Jr., a Second Lieutenant in the Air Service, operating as a pursuit pilot of the 27th Aero Squadron, had, according to all accounts, the most vividly brilliant and yet meteoric career of any fighting pilot in the Air Service of the Army.

Frank Luke is credited with having brought down 18 enemy planes in 17 days. He had previously been awarded the Distinguished Service Cross and later received a second citation entitling him to wear an additional bar.

Colonel Milling Decorated By King of Belgium

Colonel Thomas de W. Milling, Air Service, Military Aviator, has been advised through the Adjutant-General that King Albert of Belgium has bestowed upon him the Order de Leopold, with rank of "Officier." This honorary distinction was conferred upon Colonel Milling as a token of the esteem of the King and in recognition of the valuable services rendered the common cause. Col. Milling served under General Mitchell while he was commander of the Air Service, First Army, and succeeded him when he was promoted.

Air Service to Co-operate With Forestry Service

Major-General Charles T. Menoher, Director of Air Service, has advised the Forest Service of the Department of Agriculture that the Air Service will co-operate with the Forest Service in order to carry out certain experimental work desired by that bureau on fire patrol. Mr. Henry S. Graves, the Forester, has been advised that he should communicate with the commanding officers of Rockwell Field, San Diego; March Field, Riverside, and Army Balloon School near Los Angeles, California, who will co-operate with the Forester in order to carry out the experimental work which he desires done during the coming summer. It is possible later that further work may be carried out at Mather Field. Conferences between Air Service officers and representatives of the Forest Service have been held for the purpose of determining further co-operation between these two bureaus in assisting in fire patrol of National Parks.

Figures for Active, Obsolescent, and Obsolete Planes and Engine on Hand Announced

(Prepared by Statistics Branch, General Staff, War Department, April 12, 1919.)

The Air Service has divided all planes and engines into three classes—"Active," "Obsolescent," and "Obsolete." The following table shows the number of engines and planes on hand for each class, according to revised figures:

	New	Used, but in flying condition	Out of Comm.	Total	Per Cent		
					New	Useable	Not Useable
Active							
Service engines....	9,725	412	277	10,414	93	4	3
Service planes....	2,264	198	150	2,612	86	8	6
Training Engines	1,997	491	155	2,643	76	18	6
Training planes....	740	1,019	344	2,103	35	48	17
Obsolescent							
Training engines....	4,541	4,417	1,900	10,858	42	41	17
Training planes....	498	1,854	552	2,904	17	64	19
Obsolete							
Engines...	1,638	116	1,009	2,763	59	4	37
Planes....	1,037	68	913	2,018	51	4	45

After completing a tour of inspection of French and British Aviation Camps, a Japanese naval delegation, consisting of Rear-Admiral K. Yosheida, Lieut.-Commander S. Kono, T. Ohzoki and S. Shayashi, and Engineering Commander K. Vitajima. This photograph was taken on their visit to the Curtiss plant on Long Island, where they were accompanied by the Japanese Naval Attaché and several naval officers

FOREIGN NEWS

Plane Quells Riot in India

Simla, India, April 17.—Aeroplanes were used to-day in coping with the disorders that have broken out in the Punjab. A mob attacked a passenger train in this district and wrecked the railroad station at Gujranwala. Aeroplanes were sent from Lahore to machine gun fire from the air.

Aerial Survey Reveals Sahara Route

Some interesting information about the regions of the Wadi Saura, Tidikelt, and the Mid-Sahara was collected during a recent reconnaissance carried out by aeroplane and motor-car under the orders of General Nivelle.

The fact is firmly established that it is possible to begin an aerial and motor-car service between the southern posts of the Algerian Sahara and the coast, via Colom Bechar, Insalah and Tuggurt. This would create a basis of revictualment for penetration across the Sahara towards the Niger.

Fokker Building Improved Planes in Holland

Two army o..cers, Colonel Earl McFarland of the Ordnance Department and Major Robert March, Jr., have been ordered to report to the American Military Attache at the Hague and from there to visit the Fokker factory in Holland.

Herr Fokker is a Dutchman and has continued his research work following the collapse of the German military machine. He is said to be considering the sale of his exclusive rights to other governments.

Danish Aeronautical Exposition Opens

Copenhagen, Denmark.—The largest exposition of flying machines ever held in Europe opened on April 12 in Copenhagen at the Tivoli. The President is Prince Axel, well known as an airman.

Vickers Announce Trans-Atlantic Service Rates

London.—Vickers, Ltd., are about to start a transatlantic air service with airships which the company was building for the British navy when the armistice was signed, and which are no longer needed. *The Pall Mall Gazette* says. The passenger rate will be £48 ($240), and mail will be carried at the rate of £405 ($2,025) a ton.

The pioneer ship will have a gas capacity of 1,200,000 cubic feet, and engines of 1,000 horsepower. Larger ships are being designed to carry 200 passengers.

Aeroplanes and Accessories to Be Feature of Birmingham Fair

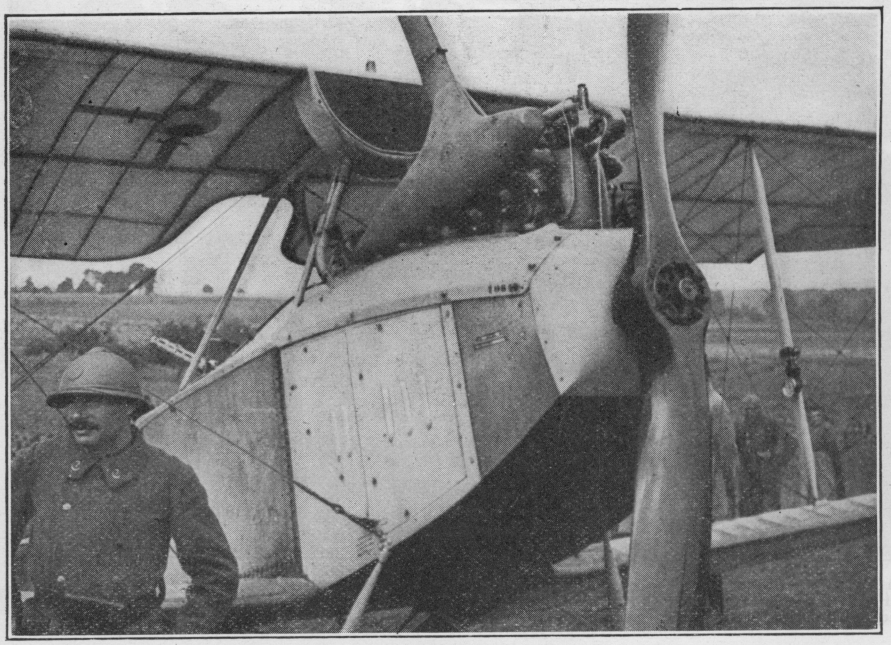
A feature of the British Industries Fair for 1920, beginning late in February, will be a display of aeroplanes, aeroplane accessories and aeroplane engines. The Birmingham Industries Fair dates back to medæval times.

Prince Albert Now Royal Air Force Staff Officer

Captain H.R.H. Prince Albert, K.G., R.A.F., second son of the King, has been appointed from Staff Officer to be Captain in the Administrative Branch of the Royal Air Force.

Brazil Appropriates $500,000 for Military Aeronautics

The sum of $500,000 has been appropriated by Brazil for organization of an aviation service, purchase of aeroplanes, establishment of aviation schools and the buying of various accessories.



A German Rumpler biplane now in the hands of the French Air Service

England Organizing Extensive Aerial Police

It is stated in the "Daily Mail" that the post of "Chief Constable" and other ranks in the new British Aerial Police will shortly be open to young flying men with military experience.

The "Force," which will work in close conjunction with the existing Customs and Police Services, will be directed by Major General Sir F. H. Sykes, the Controller of Civil Aviation, and will be divided into two branches—a number of pursuit scouts and a larger body of aerodrome police. A distinctive uniform will be worn.

The police will be stationed at various points around the coast to be known as "arrival stations," at which all machines coming from overseas will be compelled to land. It will be the duty of the ground branch of the Air Police to examine the machines for contraband, concealed cameras, and arms, and to ascertain from the pilot, whose papers will be examined, the course which he intends to follow in the British Isles.

Prohibited areas, such as powder factories, arsenals, dockyards, and the like, will be pointed out to him, and aerodromes notified in advance of the registration mark of his machine.

The chief duty of the pursuit scouts will be the heading off of negligent aviators from prohibited areas. An orange or other small object dropped from an aeroplane through the roof of a powder-mill is considered by experts to be sufficient to cause an explosion, and regulations in this respect are likely to be very drastic.

The scouts, in all probability, will be armed with machine guns, from which tracer bullets will be fired as a warning or to shoot down air pirates, as no other means of dealing with fugitive lawbreakers in the air at present suggests itself.

Many ground and other signals are at present being devised by a special branch of the Air Ministry.

National Aircraft Factory Bought By Straker-Squire

London.—The National Aircraft Factory at Edmonton, England, has been sold to the Straker-Squire Company for $700,000 to be used for the manufacture of motor cars.

Commercial Aerial Routes Being Established Throughout England

The Tynemouth Corporation, having received an offer from a company to run pleasure trips with four-seater biplanes, has referred it to a sub-committee with plenary powers to act on the understanding (*a*) that sole permission will not be granted; and (*b*) that the proposed service shall not interfere with the free enjoyment of the foreshore.

A project is on foot to establish an air service between Leicester and Hunstanton with the object of conveying business people between the two places daily.

At the last meeting of the Leeds Chamber of Commerce, Sir John McLaren, who presided, moved a resolution expressing the opinion of the Council that the commercial use of aircraft in the transit of passengers, mails and goods had become a question of immense moment, and calling the attention of the City Council to the desirability of placing before the Government the claims of Leeds as an aeroplane centre and clearing-house for the West Riding of Yorkshire. The resolution was carried.

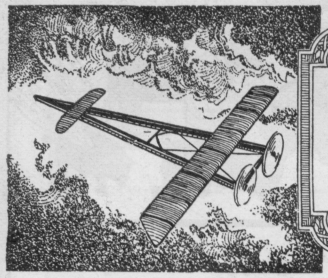
The Great Northern Aerial Company propose to make one of their stations at Bray, and have applied to the Bray Urban Council for permission to build hangars for six large machines.

Two companies are seeking the permission of Folkstone Corporation to provide flying facilities. The Blackburn Aeroplane and Motor Company (of Leeds) wrote asking if the corporation would consider a scheme to include a service between Folkestone and adjoining towns and short pleasure trips for the amusement of residents and visitors.

The Central Aircraft Company (of Kilburn) wrote that they would be prepared to arrange a regular passenger service between Kolkestone and London, besides circular tours by aircraft and aerial exhibitions of all kinds.

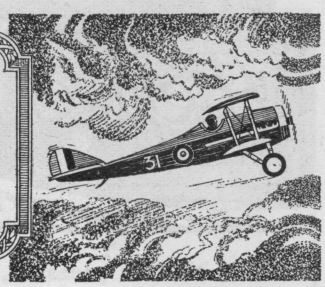
British Insurance Companies Fix Premiums

Insurance companies are already fixing the premiums for insurance against personal accidents for flying passengers and for goods sent by air. It is stated that the rates for personal risk will probably work out as follows per £100: London-Paris, 3s.; England-Italy, 5s.; England-Bombay, 25s. Rates will vary according to the nature of the journey. For a journey overland from North Africa to India, for instance, the premium will be about 10s. per cent., whereas the oversea route to India from South Africa will be 17s. 6d. per cent. Inside the United Kingdom the premium for passengers is provisionally fixed at 2s. 6d. per cent. The percentage rates for goods-carrying have already been fixed as follows: United Kingdom, 7s, 6d.; England to N. France, Belgium, and Holland, 15s.; England to N. Italy and Scandinavia, 80s.; England to Egypt, 120s.; England to India, 300s.



ELEMENTARY AERONAUTICS *and* MODEL NOTES

By John F. McMahon



The Long Distance Racing Model

THE accompanying drawing shows a long distance type of racing model such as aeromodelists use for hand launched long distance work, and is a good model for use in the coming contests.

The best models of today have a wing of the shape shown in the drawing, and this is the most efficient from an aerodynamic standpoint.

A model of this kind will give pleasure to the builder besides winning prizes in model aeroplane contests, and the sight of one of these long distance models high in the air is truly an interesting sight, and the exercise derived from following these models for long distances is worth the time spent in building one.

While the construction is simple, a good many points must be taken into consideration when building or designing a model of this kind. One of the principal points is to have the model clean cut so it can pass through the air easily as the motor is cut down until the minimum of power needed to propel the model through the air is reached. This is accomplished by covering the wings top and bottom with some sort of thin skin, fine silk or tissue paper, doped with a solution to shrink the covering and also fill the pores.

The proper method of determining the correct amount of rubber to use is to put on a large amount of rubber and gradually cut it down until the minimum is reached that the model will fly with. The correct amount will just keep the model in the air until the rubber winds out completely. Flat rubber about 3/16″ wide and 1/32″ thick is the best for models.

Although the model shown is for hand launched flights, a simple landing chassis can be designed to attach to the "A" frame and for use in R.O.G. (rising off ground) contests.

To construct the model the frame should be made first. The main spars are made of spruce 5/16″ x 3/16″ and 40¼″ long. The spars are joined together at one end to form the apex of the frame. It is necessary to taper the spars slightly and bind with thread and glue. The other ends of the spars are notched and a strip of streamline spruce 12¼″ long and ⅜″ x ⅛″ thick is fastened with thread and glue also. To strengthen the frame, a cross piece is fastened to the spars about midway and a piece of steel wire is bent to a half circle with loops at each end and fastened to the spars. This wire acts as a brace and a terminal for the bracing wires as well. The bracing wire is the thinnest of steel piano wire, and is fastened to the loops, pulled taut as possible and fastened at a point where the rear spar and the main spars are fastened together. A frame of this shape is called an "A" frame on account of its shape.

Bearings for the propellers are fastened to the ends of the rear spar. These bearings are for allowing the propeller shaft to turn without friction, and are made of 1/32″ I. D. copper tubing. The propeller shaft on steel piano wire just small enough to pass through the hole in the tubing and still turn freely. These bearings can be made in different styles, as shown in the drawing to the right.

A piece of steel wire is bent to a "V" shape, and the ends bent back to form a hook. This is used at the apex of the frame to fasten the wires to, and is also bound with thread and glue.

The propellers are made to the shape shown at the bottom of the drawing and should be 12″ long and are carved out of a block of white pine 1″ thick. If the model builder does not think himself capable of making the propellers correctly he can purchase them from any model supply house, as well as bearings, wood, bamboo, etc.

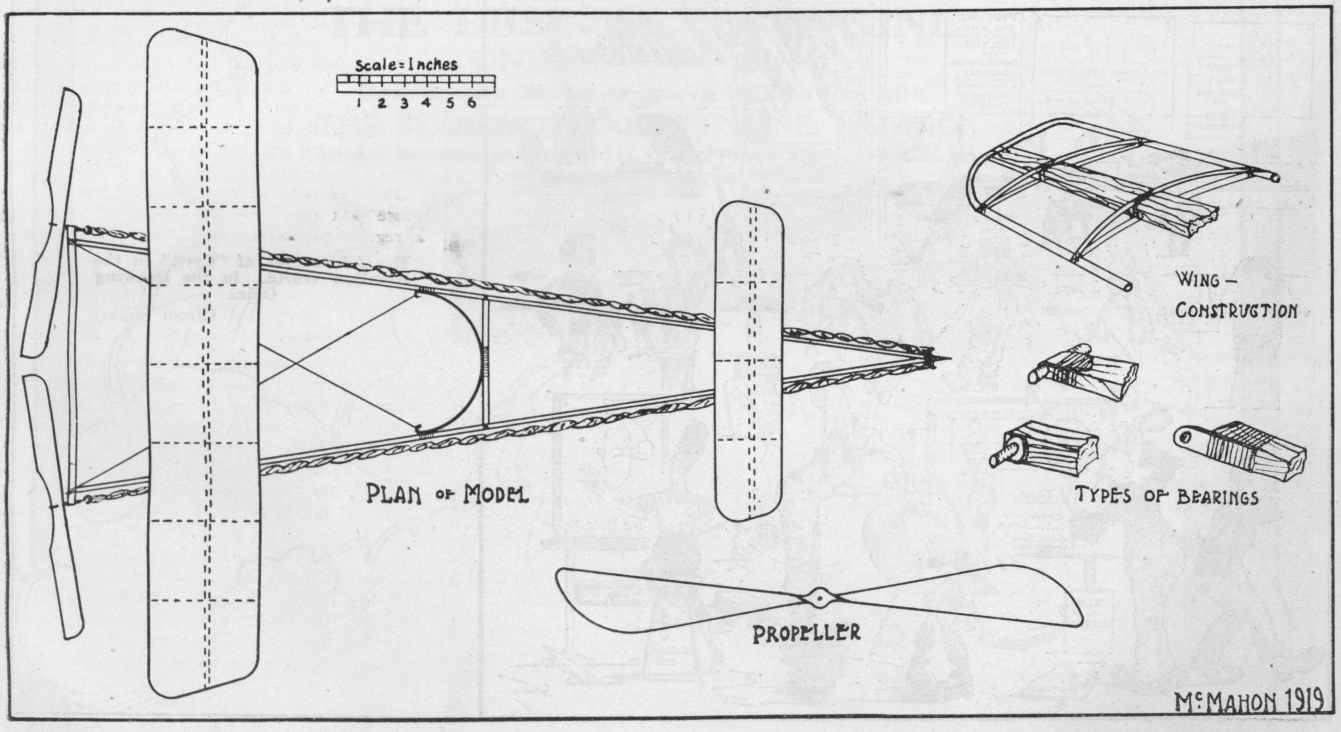
The wings are made up of bamboo and spruce, the spruce piece running through as a sort of back-bone. The spar is 3/32″ x 1/16″ and the ribs, trailing edge and entering edges are bamboo.

The construction of the wing is clearly shown at the right of the drawing. All dimensions can be ascertained by using the scale at the top of the drawing.

The wings should be covered with what is known as "Gold Beaters Skin." This can be purchased at model supply houses or from wholesale druggists. The skin is applied by heating over a fire and then fastened to the frame of the wings with Amberoid glue and doping with a mixture of Ambroid glue diluted with acetone and banana oil.

When covering the wings cover one side then dope it, after which the other side can be applied and doped.

If constructed properly this model will make flights of 3,000 feet and over. One thing must be remembered and that is, the ribs of the wings as well as the edges must be only 1/16″ round bamboo, if made thicker the model will be too heavy.



Aeronitis is a pleasant, a decidedly infectious ailment, which makes its victims "flighty," mentally and physically. At times it has a pathologic, at times merely a psychologic foundation. It already has affected thousands; it will get the rest of the world in time. Its symptoms vary in each case and each victim has a different story to tell. When you finish this column YOU may be infected, and may have a story all of your own. If so, your contribution will be welcomed by your fellow AERONUTS. Initials of contributor will be printed when requested.

Mr. Suburbia: "I think it's perfectly wonderful to think aviation has reached such a high stage that an aeroplane can land on the deck of a warship."

Aviator: "That's nothing, I once landed my 'plane on the roof of a railway signal-box in France."

When President Wilson was driving through London he glanced up at the Aerial Squadron sent to escort him on his triumphant way.

"Hum!" he mused. "No need to add a fifteenth point to my Peace Terms. They've got plenty of Freedom of the Air."

Old Gent on the allotment, as aviator crawls from his machine: "Excuse me, sir, but from a psychological point of view, I am interested in accidents."

Aviator: "Thanks, old Top" (sarcastically). "Anything I can do for you will be a pleasure."

Old Gent: "How good of you! Well, would you mind telling me the actual words you used when you collided with the other machine?"

Aviator: "By all means. When I saw old Jones coming for me in his 'bus, I turned to Bill, my observer, and I said: 'What the blithering deuce does he want here?' And Bill shook his head quietly and replied—'I'm bunkered if I know.'"

"You say you love my daughter?"

"Love her, my dear sir, I would die for her. For one soft glance from her eyes, I would jump out of my aeroplane to get down to her quickly."

"Indeed. Well, I'm something of a liar myself, and I fancy one is enough in a small family like mine."

One of our aviators took a Highland soldier up for a flip, and when he descended he thought he would astonish him by his knowledge of the Scottish language.

"I suppose, Jock," he said, "you're nearly kilt wi' the cauld (killed with the cold) in the air?"

"No, mon," remarked Jock, "but I'm cauld wi' the kilt in the air."

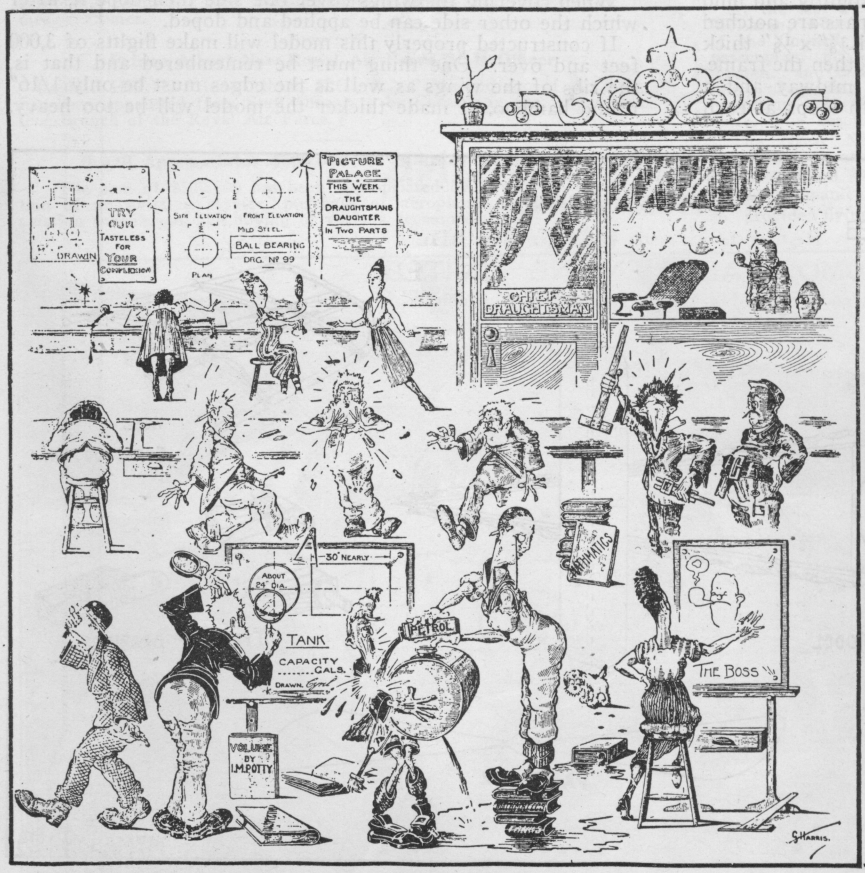
British Want Weir

Airmen are not happy over the rumored change at the Air Board. They are singing, "Oh, Weir, tell me weir has our Highland laddie gone."—From *Aircraft* (London).

1940

Twenty Years After: "Get out your 'plane, old thing, and fly across with me to join the East Kent Hounds."

"Thanks, old bean, but I'm fixed up. Just flipping off to the Pole to attach myself to the whaling fleet. Grand sport. What?"



The Adventures of "Cyril" in the Aviation World. In the Drawing Office

(From *Flight*)

(*Continued from page 337*)

to these bearings through connection into the regular pressure feed line of the Liberty engine. Thus the Liberty oil pump supplies them, avoiding an added complication of having a special oil pump in the turbo-compressor unit itself. An oil seal is made against oil leakage around the shaft by providing a washer that is a loose fit on the shaft, and which has a spherical shape on one side. This side fits against a seat in the bearing chamber, against which it is held by a spring. This construction is very effective in preventing oil escapage into the turbine casing or blower housing, as the case may be.

In several of the earlier Sherbondy designs, trouble was experienced with the gas casing, which had a tendency to warp and thus throw the turbine nozzles out of place to such an extent that they touched the turbine wheel in several instances. Other troubles were encountered due to warping of the nozzle ring and the misshaping of the nozzles themselves. In the last design, as seen in Fig. 4, however, these difficulties were overcome in large measure by bolting the nozzle ring to the compressor casing and permitting the gas casing to deflect as much as it pleased with no ill effect upon the running of the device. It is just such problems as these that Sherbondy has had to overcome throughout, for the intense heats encountered, the restricted space available for the unit and the necessity for extreme lightness are three diametrically opposed factors which must be compromised into the best possible assembly.

At F in Fig. 4 is seen the diaphragm, which is the controlling unit for operation automatically of the by-pass valves V which allow escape of exhaust in proportion to the supercharger speed required for efficient working of the turbo-compressor at any given altitude. Obviously, at ground level, these by-passes are open, whereas, at the maximum height, they should be entirely closed so that all exhaust energy is given to the turbine to operate it at top speed. In effect, the automatic control works upon the principle of differential pressure on the two sides of the diaphragm, which opens and closes a piston valve in the casting. This, in turn, operates a system of oil ports through which oil flows under pressure to open or close ports that govern the action of the small pistons of the by-pass valves. The action is thus devoid of shocks and any movement of the by-passes is gradual and lacking in jerkiness that would tend to produce undesirable shocks to the mechanism as a whole. In other words, the control system has been arranged to have a more or less damping action, making any changes in the amount of gases passing to the turbine gradual rather than sudden enough to cause trouble.

In operation of the supercharges, the air is drawn in through the passage G, is carried around by the impeller A and in its compressed state is sent to the carburetors through the outlet J. The exhaust gases are led to the gas chamber N, whence they are directed through the nozzles R to the buckets K of the turbine wheel B. The exhaust gases, after giving up their energy, are discharged through the exhaust outlet E, into which the valves V also send any gases which are not sent through the turbine, due to the automatic control feature already mentioned. There is in reality no connection between the turbine and the compressor, except through the common shaft S, which is fitted with a labyrinth between the two rotors to prevent pressure escape from the turbine to the blower casting. As a means of cooling, water is circulated through the space W between the two parts, a provision which was quite essential to assist in keeping down the excessive temperatures.

The Sherbondy machine was designed to have an air discharge capacity of 692 cubic feet per minute, when the Liberty engine is operating at 1700 revolutions per minute. Under these conditions, it is intended to handle any pressure requirements of the engine from nothing at sea level to approximately 7.5 pounds per square inch at 20,000 feet, at which altitude the atmospheric pressure is about half that at sea level.

It is computed that the theoretical horsepower available in the exhaust gas of the Liberty engine is about 80, whereas, with a compressor efficiency of around 60 per cent, the horsepower required to compress the air is about 32, indicating that the overall efficiency of the system is somewhere in the neighborhood of 40 per cent.

In the next article, the Moss turbo-supercharger will be touched upon, and consideration will be given to some of the arguments advanced for and against the turbine system of compression.

(*To be continued*)

The HS-1L and HS-2L Flying Boats

(*Continued from page* 340)

Areas

	(*Square Feet*)
Wings, upper	380.32
Wings, lower	314.92
Ailerons (upper, 62.88; lower, 42.48)	105.36
Horizonal stabilizer	54.8
Vertical stabilizer	19.6
Elevators (each 22.8 sq. ft.)	45.6
Rudder	26.5
Total supporting surface	800.6

Weights

	(*Pounds*)
Net weight—machine empty	4,359
Gross weight—machine and load	6,223
Useful load	1,864
Loading (weight carried per sq. ft. of supporting surface)	7.77
Loading (per R.H.P.)	18.85

Useful Load

	(*Pounds*)
Fuel	977
Crew	360
Useful load	527
Total	1,864

Performances

Maximum speed, horizontal flight	91 M.P.H.
Minimum speed, horizontal flight	55 M.P.H.
Climb in 10 minutes	1,800 feet
Maximum range at economic speed	575 miles

Engine

Liberty 12-cylinder, Vee, 4-stroke cycle.

Horsepower (rated)	330	
Weight per rated horsepower	2.55	pounds
Fuel consumption per hour	32	gallons
Fuel-tank capacity	152.8	gallons
Oil-tank capacity	8	gallons
Fuel consumption per B.H.P. per hour	0.57	pounds
Oil consumption per B.H.P. per hour	0.03	pounds

Shipping Data

	Dimensions	*Gross Weight* (*Pounds*)
Hull box	35′ 5″ x 8′ 6″ x 6′ 4″	8,525
Panel box	23′ 6″ x 6′ 9″ x 3′ 5″	2,900
Engine box	6′ 2″ x 4′ 4″ x 2′ 9″	1.645

Treatment of Special Steels and Metals by Means of Baths of Metallic Salts

The success of modern industry is intimately linked with the development of the physical qualities of the metals with which the engineer must construct his machines and high-speed tools.

Just as the manufacture of steel made more rapid strides than the scientific production of steel alloys, it is only recently that attention was turned to the important effect that scientific heat treatment has on the physical qualities and endurance of steel and special metals.

One of the great obstacles which the engineer has to surmount in heat treatment is the oxidation which follows and the defects which appear in the finished and polished pieces. In many cases a new sand-blast treatment and repolishing makes possible the removal of the exterior carbonization and oxidation.

Mr. Fuller, of H. Fuller & Company, Ltd., of Sheffield, England, undertook researches for the purpose of overcoming these difficulties and after several years of research discovered a process by means of which the engineer and manufacturer of steel can prevent frequent difficulties. Mr. Fuller's method consisted of plunging all parts of the machine which requires the heat treatment (such as high-speed steels, steel alloys, carbon and non-ferrous steels) in a transparent bath of metallic salts composed of a special new composition. The Fuller treatment claims the following advantages:

(1) It completely obviates oxidation, carbonization, chipping or pitting of surfaces and produces a surface of uniform durability.

(2) It reduces working and deformity to a minimum.

(3) It greatly reduces the possibility of damage of the quality of the steel or metal as a result of too long an immersion, because this metal is a complete protection against noxious gases.

(4) It permits the employment of inexperienced workers in the foundry.

(5) It reduces the number of furnaces necessary because of the very high rate of speed with which the work can be accomplished.

(6) The number of defective hardening treatments is reduced to a minimum.

(7) It is suited to all purposes. The salts being transparent and the piece under treatment is visible during the entire heating process up to the moment it reaches the exact temperature desired.

(8) It is possible to register the temperature much more exactly than in an entirely enclosed furnace. Every practical workman will appreciate the tremendous advantage which there is in the possibility of approaching within a few degrees of a desired temperature when it comes to special metals. The immersed article must acquire at the proper rate the same temperature as the molten mass which surrounds it.

(9) The salts are not toxic; they are consequently harmless and without noxious effect on the immersed metal or the worker himself; there is no noxious gas emitted and in consequence the furnaces require neither cover nor pneumatic device for conducting noxious gases.

The transparent non-oxidizing "Fuller" salts are already in use by the most important mechanical construction firms and everywhere they have been furnished they have resulted in new orders. This discovery is considered to have great possibilities if, as contended by the inventor, it gives infallible results.

(Translated from *Le Revue Technique*)

Flying Tuition

Frank Mills, Senior, flying instructor of the Army Air Service, has taken possession of the Essington Aviation School known as Chandler Field and formally operated by Mr. Robert E. Glendenning. The best facilities for water flying in the country and instructors of long experience in army and civilian flying. Enrollment now proceeding, flying course, $400.00. Address communications to Frank Mills, Essington Aviation School, Essington, Pa.

Advertising in this department 10c a word $2.50 minimum

Classified Advertising

Forms close for this department on Monday preceding date of issue

BUILD THAT NEW AEROPLANE now for the coming flying season. Get Catalogue L propeller and motor from America's oldest aeronautical supply house. 12c. stamps. Heath Aeroplane Co., Chicago, Illinois.

FOR SALE: New Atwood Flying Boat equipped with Thomas-Morse 135 H.P. slightly used motor with Christensen Starter. Price, $1,500.00. B. T. Epps, Athens, Georgia.

FOR SALE: Two 8-foot propellers (U. S. Propeller Co.) unused, copper tipped, cost $120 each. What offers? Harry Nicholas, 4735 Grand Central Terminal, New York.

WANTED AT ONCE one, two or more passenger aeroplanes, new or used, with or without motor. State details and terms. Raymond, 196½ Montclair, Detroit, Michigan.

FOR SALE: Propelling Turning Lathe, Drill Press, Arbor Press, Balancing Stands, Clamps, Benches, etc., in excellent condition for propeller manufacturer. For full list apply Box 322, Aerial Age, 280 Madison Avenue, New York, N. Y.

MODELS — Model Aeroplanes, Accessories, and Supplies. Materials suitable for the construction of models that will fly. Send 5 cents for illustrated catalog. Wading River Manufacturing Co., 672 Broadway, Brooklyn, N. Y.

FOR SALE: An aeroplane assembling plant with three two-seated biplanes and a lot of material and tools which I have taken under mortgage. A great opportunity for passenger flying and teaching aviation school. Address A. Besse, Pittsburg, Kansas.

FOR SALE: Small Tractor Biplane Parts, with 4 cyl. Kemp Motor, Propeller, Landing Gear Fittings, Lot Struts, Ribs, etc., successful working drawings 20 x 4 wheel, tire and tube, all for $175.00. 665 N. Snelling Avenue, St. Paul, Minnesota.

WANTED FLYING BOAT OR SEAPLANE, one or two passengers. It must be complete and modern. Curtiss M. F. Boat preferred. Address Box B, Deerwood, Minnesota.

FOR SALE: Two Roberts Aeroplane Motors, 50 and 65 H.P. complete, also Benoist Tractor Biplane with Dep. Control. Aviator Solbrig, Davenport, Iowa.

FOR SALE: Curtis 40, four cylinder, first-class condition guaranteed, also spares $200. Pusher plane, needs minor repairs $100. Turnbuckles and bolts, bargain. Address Box 339 AERIAL AGE, 280 Madison Avenue, New York, N. Y.

FORD MOTORED AEROPLANE:—Complete drawings covering necessary changes to Ford motor and construction of the machine, in fact the most complete drawings ever offered for a light type aeroplane. This machine can be built by anybody and has proven a success. A limited number of these drawings will be sold for $5.00. If in doubt write to Modiford Aero Co., 1018—94th Street, Woodhaven, New York.

BUILD: The strongest, fastest, lightest and most up-to-date Tractor Aeroplane, flies with twin motorcycle engine or some four cylinder engines with their weight reduced. Write now for prices. Clarence Zobrist, Highland, Illinois.

FOR SALE: Exhibition tractor biplane (new) built for 50 or 60 H.P.M. without motor. A. Neisler, 4041 Ellis Avenue, Chicago, Illinois.

WANTED AT ONCE: Aeroplane Motor about 20 H.P. twin opposed air-cooled. Good condition. Price and description to Emil Bauer, 458 Wisconsin Street, Kenosha, Wisconsin.

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by
"AERO EXPERTS"

THE members of the *Aircraft Advertising Agency, Inc.* are all ex-officers of the United States Army Air Service, with both theoretical and practical knowledge in the Aeronautic Field, assuring expert service for clients.

GRANVILLE A. POLLOCK, President of the *Aircraft Advertising Agency, Inc.*, previously to his release from the Army with the rank of Captain, served in the war from its beginning and was a member of the famous "Lafayette Escadrille." In addition to this war aviation service, Captain Pollock is by profession an aeronautical engineer.

S. HERBERT MAPES, Vice-President of the *Aircraft Advertising Agency, Inc.*, is another Air Service Captain who has recently laid aside his uniform after having served in important capacities at various aviation training fields in this country. He is well known as an automobile racer, an exhibitor of saddle horses and a winner of Horse Show Blue ribbons, as well as being a member of many prominent clubs.

REED GRESHAM LANDIS, of Chicago, son of Judge Kenesaw M. Landis, is also a Vice-President of the *Aircraft Advertising Agency, Inc.* Besides having been a Major in the American Air Service, he has the added distinction of being the second ranking American "Ace" with 12 Air Victories to his credit.

WILLIAM MENKEL, Secretary of the *Aircraft Advertising Agency, Inc.*, also served as a Captain in the Air Service, holding various positions at Washington and in the field, including that of Commanding Officer of the Aviation Repair Depot at the Speedway, Indianapolis, Ind. Previously to entering the service, Captain Menkel was for more than 15 years associated with the American Review of Reviews.

The AIRCRAFT ADVERTISING AGENCY, INC. aims to cover the advertising field for aeronautics, including:

DISPLAY ADVERTISING for General Advertisers on Dirigible, Kite, and Spherical Balloons, Aeroplanes, Streamers from Aircraft, and by the dropping of Souvenirs and Handbills from the Air;

PREPARATION of COPY and SKETCHES and the PLACING of ADVERTISING for manufacturers of Aircraft, Accessories, and Aviators' equipment in aircraft and other periodicals.

AERIAL PHOTOGRAPHS of Cities, Summer Resorts, Country Places, Real Estate Developments, Etc.

RATES ON APPLICATION.

The Aircraft Advertising Agency, Inc. is now booking the space for exhibitors at the **Second Pan-American Aeronautic Convention and Exposition at Atlantic City, N. J., May 1 to June 1, 1919,** and also has charge of the preparation of the elaborate souvenir Program, advertising rates for which may be had on application.

The Aircraft Advertising Agency, Inc. also controls advertising space on Aeroplanes, and kite and Spherical Balloons operating from the permanent Aviation Field at Atlantic City, N. J., and on the 36,000 square feet of Bill Board space on the fence of this Aviation Field.

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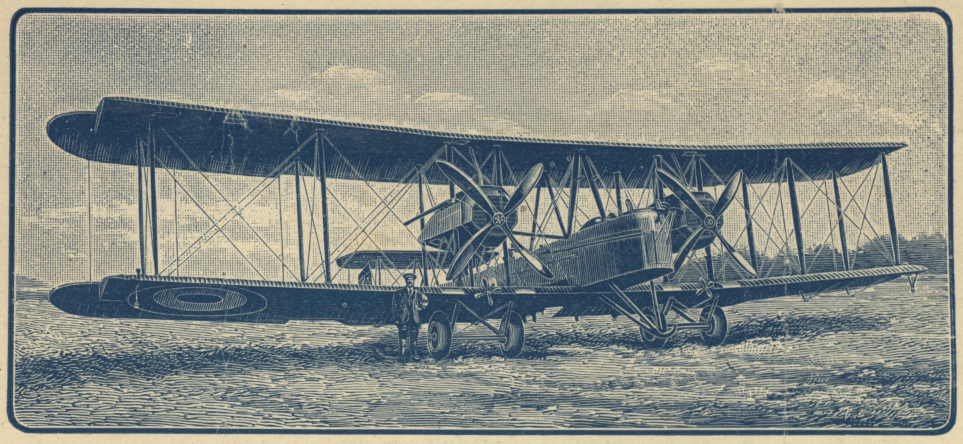

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